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Some of the More Important Insects Affecting Our Farm Animals*

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THE subject allotted me is such a comprehensive one that it would be a physical impossibility to more than scratch the surface, so to speak, in the time usually consumned in an ordinary paper; and even then, I am afraid I will have to boil the subject matter down to the limit of a synopsis, rather than anything approaching an exhaustive treatise, as, within the past decade or two, insect life has been found to play a much larger part in the transference of disease than was heretofore even dreamed of.

Many years ago, I, personally, had gained the impression that, as time went on, it would be found that insects, especially flies of different kinds, were responsible for the conveyance of many of the communicable diseases, which at the time had, perhaps, not been suspected, or, at least, the suspicion had not gained very wide publicity. Perhaps I was led to this impression through my connection with anthrax in the Lower Mississippi Valley, and its widespread character in certain seasons, particularly those in which tabanids, or horse-flies, were exceptionally numerous.

True, the horse-fly had been credited with the causal agency of this disease; but the erroneous idea prevailed that the disease originated wholly with the fly, and that it was the sole cause of the ailment, rather than the mechanical transmitter of the Bacterium anthracis.

Our impression at that time, with regard to insect transmission, seems to have been more or less verified in the numerous diseases that are now known to be dependent, for their spread, upon flies, and other dipterous insects, either as mechanical transmitters, or as obligated hosts, of some of our most important disease-producing organisms.

I do not wish you to get the impression that it is my desire to pose as a professional entomologist. You are all well aware that this branch of science is one to which an individual must devote his entire time, in fact, his life, in order to become at all proficient. Consequently, while I have been able to embody some of my own personal experiences and observations in the make-up of this paper, I have been forced to draw copious draughts from the fountain of knowledge acquired by those who have made a special study of insect life in its different phases.

It is not my purpose to go into a systematic grouping of parasitic insects, as this would occupy much more time than I have at my disposal; nor do I think it at all necessary in a paper of this kind. I believe that the selection of one or two of the more important orders, with a few of their families, will be all that we will be able to cover at this time; and the first which I purpose to discuss is the order, diptera,

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which includes flies, gnats, mosquitoes, and pseudo-ticks.

The insects of this group are readily distinguished by their having only one pair of wings, the second pair, common to other insects, being represented by a pair of rudiments or modified structures called halteres or balancers.

In many of the parasitic forms, however, the wings are entirely wanting, as in the sheep tick (Melophagus ovinus). They have suctorial mouth parts, and, in the forms attacking the various animals, these

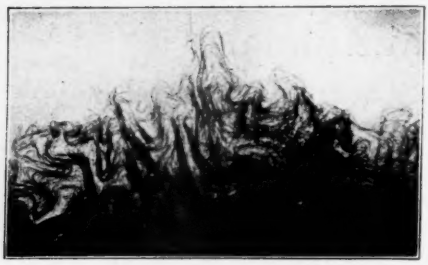

Fig. 1. Margin of an Anthrax Colony. *La. Exp. Sta. Bul.* 136

parts become readily adapted to penetrating the skin in order to reach the small blood-vessels.

The larvae are fleshy grubs, or maggots, or slender worms adapted in the different families to widely different conditions of existence, but in nearly all cases requiring some degree of moisture. In this respect they range all the way from the entirely aquatic mosquito larvae to the forms which mature in comparatively dry situations, in earth, or even upon plants.

The pupae are, in some cases, formed by the simple contraction or hardening of the larval skin, and in disclosing the imago, may either split on the dorsal surface or in a circular manner, so that a cap is separated from the head end, leaving a round aperture through which the adult emerges.

While comparatively few are parasites in the strict sense, the group includes many of the most troublesome of the insect enemies of live stock.

The Common House Fly

Muscidae is the family of diptera to which our common fly belongs, and I think it may not be out of place to briefly consider that pest, to both man and beast, as well as a carrier of disease germs of no mean ability—the common house fly (musca domestica).

It is claimed by entomologists that the egg-mass of the female house fly contains about one hundred twenty ova, and that a single fly will lay four such batches of eggs. The life cycle of this fly is about ten days; and in the latitude of Washington, D. C., for example, according to Dr. L. O. Howard, Chief of the Bureau of Entomology, the generations number twelve or thirteen in a single season. In the longer, warmer, seasons, such as we have in the more southerly part of the country, the number of generations are, no doubt, considerably increased.

We are all familiar with the great prominence this pest has gained in recent years in connection with the transmission of some important diseases of the human family, such as typhoid fever, dysentery, infantile diarrhea, etc. However, in the case of animals, apart from its irritating and annoying effects, it may not have been reckoned at its true value as a transmitter,

Fig. 2. Anthrax colonies showing tracks made by a fly's infected feet on agar. *La. Exp. Sta. Bul.* 126

or carrier, of some of our most fatal infections.

Only recently at the Louisiana Agricultural Experiment Station, we have been able to verify, to some extent, at least, the veracity of this statement during the course

of some experiments with possible carriers of anthrax infection. Dr. Harry Morris, assistant veterinarian and bacteriologist of the station, when posting a guinea-pig that had died of anthrax, observed a common house fly feeding upon the viscera in the abdominal cavity of the pig. Having a Petri dish with agar medium convenient, he succeeded in getting the fly on to the culture medium in the dish; and after incubating this for a period of twenty-four hours, there could be seen colonies of anthrax organisms at every point the fly had touched with its feet.

Here, then, was a case of infection by simple mechanical transmission. But, another test was made of a somewhat different character. A fly that had been fed virulent anthrax culture in a large wide-mouthed bottle, was transferred at intervals into three other sterile bottles, in order to prevent contamination, and from the side of the last bottle a single fly-speck was carefully transferred to fluid agar; shaken up, and further transferred to a sterile Petri dish. This was incubated for forty-eight hours, with the result that the entire field was covered with anthrax colonies.

From the above-mentioned tests, it may readily be inferred how the common house-

Fig. 3. Anthrax colonies from a single fly speck. *La. Exp. Sta. Bul.* 136

fly may not only be the mechanical bearer of this death-dealing infection on its feet, and the hairy under surface of its body, but carry in its dejecta, and deposit, when nature calls, the organisms of this disease, which is often so fatal to both man and beast in various parts of the country. And if this is possible in the case of anthrax may it not also be so in hog-cholera, and other diseases of animals that have not as

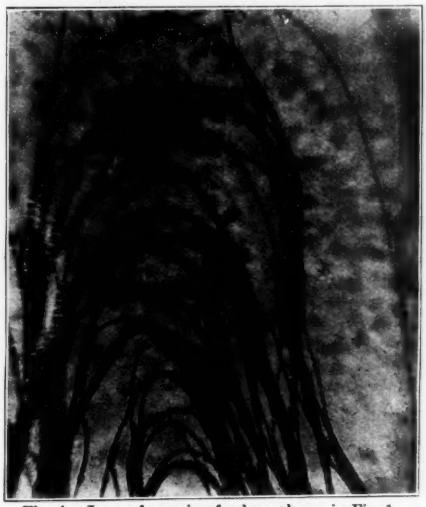

Fig. 4. Loop of margin of colony shown in Fig. 1. *La. Exp. Sta. Bul.* 136

yet been fully investigated in this connection?

In dealing with this fly, it is necessary, of course, to get at its breeding places, and endeavor to destroy it in the egg and larval stages. It breeds chiefly in horse manure, although it may be found in trashy places about yards, in closets, etc. This would suggest, therefore, the treatment of manure, when practicable, with some effective inexpensive insecticide, such as chloride of lime; its removal at the earliest possible moment; sanitary cleanliness generally; and the screening of stables, when that can be accomplished.

The Stable Fly

Another representative of this family is the stable fly, biting, or stinging fly (stomoxys calcitrans).

To the uninitiated, this fly so closely resembles the common house fly as to be considered one and the same; only, they (the uninitiated) are at a loss at times to understand why this fly should get fits of biting or stinging. The supposition that

they are the same, however, is an error, as the two are quite distinct.

This is a well known species; is widely distributed, and is a familiar pest in many countries. It is said to have been described by Linnaeus in 1761. Its bite is severe, a great amount of annoyance is caused our domestic animals by it. It is also frequently very troublesome to people working in the vicinity of haunts in which it abounds. In fact it was announced by Prof. M. J. Rosenau, of Harvard University, at the recent International Congress on Hygiene and Demography in Washington, D. C., that he had apparently succeeded in transmitting poliomyelitis, or infantile paralysis, from sick to well monkeys by the bite of this fly. Dr. Rosenau concluded from his experiments that, after the virus of poliomyelitis is taken into the body of the fly by biting an infected person or animal, some time must elapse before the fly is capable of transmitting the disease; and that the period which must elapse is probably less than twenty-one days.

It would seem that this fly appears in great numbers in different parts of the country during the present year and occasioned considerable damage. Mr. Bishopp, assistant in the Southern field crop insect investigations in Texas, kindly furnished me a memorandum of some of its depredations. It seems to have appeared in great numbers in the north-central part of Texas and certain parts of southern Oklahoma; also in Kansas and Nebraska. It is difficult, says Mr. Bishopp, to estimate the loss chargeable to this outbreak.

The loss due to the death of cattle, mules, and horses, was by no means inconsiderable, probably 300 head would be a conservative estimate, the greater number being among cattle. Many of the deaths, however, were only indirectly due to the fly, among which might be mentioned runaways caused by the irritation of the bites. One of the most important indirect losses was caused by the inability of the farmers to make fall preparation for their winter wheat at the proper time, as it was frequently impossible to work their animals in the fields during the daytime. In the case of dairy cows, the great loss was due to the reduction of the milk supply. This reduction ranged from forty to sixty percent of the total output of many herds. And there was also a marked falling off in the weight of animals everywhere throughout the afflicted districts.

Prof. Herbert Osborn, of Ohio, and others, state it is especially charged against this species that they have been the means of transmitting anthrax, and possibly other diseases, among cattle.

This author also mentions that this fly is not confined to stables or other quarters of domestic animals, but occurs frequently in shady places, groves, and in dwellings, especially in cloudy weather. It is claimed, however, that the species has been reared with others from horse manure, and it may be considered as established that the eggs are laid in manure, and the larval stages passed there, requiring greater or less time for their development, a number of generations being produced each year.

The prompt disposal of stable accumulations would, therefore, assist greatly in reducing the number of this pest. For, if, as Dr. Rosenau states, the virus of poliomyelitis has to remain in its body for a length of time before it is capable of transmitting the disease; and the further fact, according to Curry, in Manilla, that it is the principal agent in the transmission of the trypanosome of surra, it is possible that we have in this fly a carrier which is much more dangerous than had, hitherto, been suspected.

The Horn Fly

Another important member of the family, muscidae, is the horn fly (haematobia serrata).

This is one of the worst of the European biting flies that attack cattle; but notwithstanding the large number of importations of live stock from that continent to this, during nearly three centuries, it was only discovered and reported to the U. S. Bureau of Entomology in the fall of 1887 as occurring near Camden, New Jersey. The following year it appeared in Maryland and Virginia, and by 1891–1892, it was found over the continent from Canada to Texas, and from Massachusetts to the Rocky Mountains. In 1897 it was carried with cattle from the Pacific Coast to Honolulu,

and from there spread to all the islands of the Hawaiian group.

During the past summer this fly has been exceptionally abundant in the Gulf States, and, presumably, in other sections of the country, and the damage done has, necessarily, been proportionate to the numbers of the insect.

Being a blood-sucker, the chief damage is occasioned as the result of irritation, which prevents proper feeding and the normal assimilation of food, and, in consequence, the loss of flesh or lessened milk production. There is also, of course, the actual loss of blood, which may be quite considerable when these flies are abundant, as they have been the past summer. And we in Louisiana are somewhat suspicious that, during outbreaks of anthrax, they may, as mechanical transmitters, be factors in the spread of this infection.

Except when these insects are in great abundance, they seem to have a preference for dark-colored cattle, or the dark portions of animals that have both dark and light patches, such as the Holstein. This is no doubt due to mimicry, or the natural instinct to protect themselves by taking advantage of the color of their surroundings being similar to their own.

When feeding, the horn flies generally attack the sides of the chest, and other parts where it is difficult for the animal to reach with head or tail; and when disturbed on one side, they move over to the other, and keep this up until they become satiated, and the animal frequently worn out by its almost constant efforts to rid itself of the pest.

In the resting stage, the flies frequently cluster around the base of the horn, in horned cattle—hence the name, horn fly.

According to Marlatt, the egg-laying habit of this insect was not easily discovered, and is somewhat peculiar. The eggs are laid singly, and usually upon their sides on the surface of wet cow manure. So far as is known, they are laid upon no other substance, and never upon old droppings. The moment the manure is dropped, a swarm of flies dart from the animal to the manure and remain there a few seconds, or a minute at the most, during which time many eggs are deposited. Egg-deposition is chiefly during daylight, and most abundant during the warmer morning hours.

The larvae upon hatching descend into the manure, remaining, however, rather near the surface. The puparium, or pupa, is found in the ground underneath the droppings. The time elapsing from the egg to the adult is from ten to seventeen days; and, in the latitude of Washington, according to Marlatt, there are probably seven or eight generations annually, with more in the South, and continuous breeding in tropical regions, like the Hawaiian Islands.

Studies of the winter habits of this insect would indicate that hibernation takes place, either in the adult stage, or in the pupa below the surface of the ground.

It seems to have been established by the Bureau of Entomology that some of the natural enemies of this fly have been discovered.

However, the simplest practical method of control, so far as we are concerned at the present time, would seem to be the destruction of the larvae and pupae in the cattle manure by direct measures; the protection of cattle by suitable repellents; and the actual destruction of the adult flies.

Since using the alkaline arsenical solution for the destruction of cattle ticks in the South, it is found that great numbers of these flies hang on to the animals and are killed in the ordinary process of dipping in the vats. But while myriads of adult flies are destroyed in this way, dipping for tick destruction is only practised every fourteen to twenty-one days during the season, leaving too great an interval between to be of the greatest practical service. Consequently, some additional method should be adopted that could be practised at shorter intervals, or a system of dipping with insecticidal materials that would serve the purpose without injuring the cattle.

There are various mixtures recommended to be used as sprays, and the old standard insecticide, kerosene emulsion, still seems to be one of the best for this purpose.

Under range conditions, however, the ordinary dipping-vat is being so modified, with high splash-boards, etc., as to form a

fly-trap, so that when the animal plunges in, the flies which escape immersion, go to the upper part of the vat, and are killed by the spray made by the animal when it plunges into the solution.

Some other methods are in vogue, such as driving the cattle through a large cylinder, through the sides of which a powerful gasoline pump causes sprays of an effective insecticide to strike the animals from all quarters and thoroughly wets them.

These latter methods, of course, destroy adult flies in great numbers, but wherever practicable, the other, and very important, method of destroying the maggots and pupae in the fresh droppings, should not be overlooked, in order that greater headway may be made in the control of this pest, which is costing the country so much in the aggregate.

The Screw-Worm Fly

Some years ago, the screw-worm-fly (chrysomyia macellaria) was a veritable plague in the Gulf States. However, since about 1891 or 1892, we seem not to have been troubled with it to any extent as a severe pest to our farm animals. While its habitat is given as from Canada to Patagonia, the greatest damage from it has been within the tropical and sub-tropical belt.

During the years of its greater prevalence not only animals, but human beings, also, suffered from its ravages.

The fly lays a mass of some three or four hundred eggs on the surface of wounds, which, in a few hours, hatch into larvae, and these make their way directly into the wound where they feed on the surrounding tissues until full grown, when they come out, drop to the ground, pupate, and, later, the adult fly emerges. Any fresh wound, however small, seemed sufficient to attract this fly at the particular period mentioned. The greatest sufferers were the young creatures, such as foals, calves, etc., while their umbilical stumps were still in a raw state, and the openings still unclosed. Eggs were laid on these structures, and in a few hours the larvae had gained access to the abdominal cavity, with enormously fatal results.

The flies, however, seemed to pass from us, in plaguelike numbers, at least, and although present more or less all of the time, we do not hear of any great damage being done by them.

Eggs are said to be laid, not only in, or on, fresh wounds, but also in decaying vegetable matter, carcasses, etc., so that it would appear this fly is somewhat omniverous in its taste, and this may account, on some measure, for its attacking fresh wounds when other classes of its food become scarce or difficult to obtain.

The usual line of treatment was to apply to, or pack, the wounds with some effective agent to destroy the larvae or maggots; and, if possible, repel attacks of the fly.

Botflies of the Horse

Belonging to the family, estridae, are the botflies, some of the species being extremely destructive in various ways.

You are all, doubtless, quite familiar with this family of Dipterous insects, and I will only touch upon some of the more important phases of their life history and the damage occasioned by them.

The mouth-parts of this group are either rudimentary or entirely wanting, so that the flies can neither bite nor pierce the animal's skin.

According to Verrill, the eggs of the gastrophilus equi, the horse botfly, contain more or less perfectly-developed larvae when laid; and when they are mature, or have been a few days attached to the hair; they burst open and allow the young to escape almost instantaneously, when moistened. Thus, when the horse licks itself or its companions, the warm moist tongue hatches the eggs, and the young larvae are transferred to the stomach, where they fasten themselves to the lining membrane by two hooks.

It has been said, that the grub, or bot, spends about eight months in the alimentary tract; six weeks in the pupal stage outside of the body; and after the fly emerges from its pupal case, it occupies the remaining ten weeks of the twelve months proceeding with the business of providing for another generation of bots.

But, in addition to the gastrophilus equi, there are other botflies affecting the horse, viz., the gastrophilus hemorrhoidalis, or red-tailed botfly, and the gastrophilus

nasalis, or "chinfly." Their habits are similar to the equi. There are certain distinguishing characteristics, however, as to color and size and the tendency to attack the neighborhood of the lips and nose within easy reach of the tongue.

As a matter of prevention, the indications would, necessarily, point to preventing the fly from laying her eggs by suitable repellants; the use of a solution, such as carbolic acid, some of the coal-tar dips, kerosene, etc., to destroy the eggs attached to the hair; or shaving the eggs off with a sharp knife or razor.

In case of stabled animals, ordinary good grooming will generally serve to remove any eggs present; but with horses, colts, etc., at pasture, the case is different, as the animals may, in some cases, not be seen for considerable periods. However, it may be possible, during the late summer and early fall, to have this class of stock examined at short intervals, of a week or two, and the eggs removed or destroyed, which may be accomplished in the manner, and with the materials, just suggested.

It is difficult to recommend any single, definite line of action that may be considered *par excellence*. However, a working knowledge of the life history and habits of the insect may often suggest methods that will prove more or less effective in many cases.

As to remedial measures, well, all sorts have been recommended. Those which happen to be administered at, or about, the time the bots are leaving the digestive tract in considerable numbers, and of their own accord, generally get the credit for removing larvae and are hailed as being "specifics."

So far as my information goes, the bisulphide of carbon seems to have given the the most satisfactory results in the removal of the estrus larvae. It was Perroncito, I think, who was the first to report on the use of this agent in this connection. It is recommended to be given to adult horses in gelatin capsules containing ten grams each; and eight grams for colts. One capsule is given at one-hour-intervals until three have been administered; and the last capsule followed, twelve hours later, by a purgative.

Warble Flies

Passing to the botfly of cattle, sometimes called warble or wolf flies, the interesting announcement was made by Dr. Cooper Curtice some years ago, and which seems to have been verified since, that the larvae reached the backs of the animals through the mouth, and by way of the esophagus, which was quite a discovery, and indicated that our common form was not the estrus bovis, of Europe, but estrus lineata, or heel fly, likewise, however, European in distribution. The larva is said to occupy several months in getting to the skin; while the development after reaching this location is more rapid.

The losses from warble flies may be considered from three points:

1. Loss on hides perforated by the grubs, subjecting them to discount or rejection in the markets.

2. Loss in milk and beef supply, caused by fretting and stampeding, due to the presence of the flies when depositing their eggs.

3. Loss of vitality and weakened condition, and consequent loss in milk or beef, due to the presence of the warbles in the back, and possibly the sores occasioned by them.

It is difficult to obtain an accurate estimate of the sum total of these losses, but as the result of many inquiries and testimony from numerous sources, the late Miss Eleanor Ormerod, the British entomologist, estimated the loss in England at $5 per head for cattle. What the aggregate amount in this country would be, it is hard to say, but it would certainly run away up into the millions of dollars. Prof. Herbert Osborn states, that, omitting the creature's comfort as a matter of mere sentiment, and considering the question from the practical standpoint of money returned, it requires only the very modest estimate of the loss of $1 per head to the cattle of the United States to show a loss of about $36,000,000 sustained by the country on the basis of the Census of 1880. But, in 1910, there were something over 69,000,000 milk cows and other cattle in the United States, which, at one dollar per head, would make the loss from the ravages of the warble fly total up the enormous sum of.

approximately, $69,000,000, even at the low estimate of one dollar per head.

The remedial measures recommended are several, viz., those to prevent the deposition of eggs; those to destroy the eggs and young grubs; and those to kill the larvae passing under the hide. I am firmly of the opinion, however, that if the standard arsenical solution was systematically used, all over the country, as it is with us in the South for the destruction of cattle ticks, it need not be many years before the country was practically free from these expensive parasites. It is our experience, that, in sections where dipping in this solution has been practised regularly and systematically for a season or two, cattle are practically free of these grubs, wolves, or warbles, in their backs.

The Sheep Bot

The last of this group which I will mention, briefly, is the sheep botfly—estrus ovis.

The older authorities claimed that this fly laid its *eggs* in the nostril of sheep. Later observers state, however, that the living *larvae*, or maggots, are deposited, and that this point may now be considered as well established, except, perhaps, when the flies are fortunate in finding their victim without delay, eggs may be deposited, but in such cases they doubtless hatch immediately after deposition.

The larva at once begins to work its way up the nostrils and nasal passages, and frequently reaches the sinuses. It attaches to the membrane by two small hooks and feeds upon the mucus. When ready to assume the pupa form, those grubs that are able to do so, pass down to the ground where they quickly bury themselves. They remain in this dormant stage for about forty or fifty days, or longer, according to weather conditions, when each fly pushes open a little round cap-like portion at the head-end of its covering and thus emerges fully matured.

The grubs found in the head may range from two or three to quite a considerable number. I have, myself, taken forty-two of these larvae from the head of a sheep, that had died from parasitism, of a different nature, however.

The prevention of the deposition of the young larvae is generally the point aimed at, and various means are resorted to to accomplish this end. One method that is quite common, is to bore two-inch auger holes in a log; fill the holes with salt; and smear tar around the upper edge, so that the sheep, in obtaining the salt, tar their own noses. The tar acts as a repellent to the flies.

Valuable animals may be trephined to remove the grubs from the sinuses.

I am rather inclined to the opinion that the country butcher-pen is a great harborer and breeder of these flies, and, that, if sheep's heads, which are often thrown away as offal in such places, were carefully destroyed, to destroy the larvae that may pass from them to the ground to pupate, it might materially reduce the number of these flies in each locality.

Horseflies

Another source of great annoyance to certain classes of live stock, and which it is believed is also responsible for the transmission of some of the important infections is the family, tabanidae, to which the horseflies belong.

The members of this family are large, some of them being among the largest of the order, diptera; and the females are provided with powerful mouth-parts by means of which they inflict painful bites upon horses, cattle, and other animals. Their flight is very strong and rapid, and is attended with a buzzing, tormenting noise.

Such of the larvae as are known are either aquatic, or live in moist earth, and are carnivorous. But notwithstanding the abundance of the insects, comparatively little has been done toward determining the early stages of the species.

Being carnivorous, and predatory upon snails, injurious insects, etc., the larvae of the tabanids have sometimes been classed as beneficial, which may compensate, in some degree, for the bloodthirsty habits of the adult females. They are, unfortunately so far as the animal is concerned, not open to successful attack in the larval stage.

Tabanids are widely distributed—species occurring in all parts of the world. Up to about 1896, it was said that 1300 or more

species were known, of which 150 were credited to North America. Since that time, however, the number has been considerably added to; over 300 species having been catalogued so far.

The circumstantial evidence with us in the South is strong enough to force the conviction that these flies are wide distributors of anthrax infection, as it seems to be in seasons of their greater prevalence that this disease is most abundant.

Powerful repellents are recommended or nets, in the case of animals that are being used. A thin film of kerosene over pools of stagnant water, frequented by the flies, will destroy large numbers of them; this was recommended, some years ago, by Porchinski, a Russian entomologist. But the greatest relief will come through clearing, draining, and cultivating the land areas which at present form the breeding places of these animal pests.

Black Flies or Buffalo Gnats

Just a word about buffalo gnats, family, simuliidae.

There are several species of buffalo gnats, and the injuries caused by them are among the most serious resulting from insect attack on domestic animals. They are small black flies, with a humped thorax, and the head bent under, somewhat resembling the buffalo, and from which, I presume, they received their name. The early stages are aquatic, and the larvae of the Southern buffalo gnat (simulium pecuarum) is carnivorous, and probably others have a similar habit.

These gnats evidently emit a poison when biting, and a number of remedies have been tried to counteract it, but without any uniformity of effect. Aqua ammonia, externally; and, internally, ammonium carbonate and whisky, have been used on affected animals with fair results; at the same time keeping them in a cool darkened stable; and, also, immersion in the cold water of running streams. Burning smudge attached to the hames is a method frequently adopted with work animals in the field.

While it has not been absolutely shown that these gnats are responsible for the transmission of disease—except their presumed connection with the transmission of pellagra—their habits of feeding upon so many different varieties of animals, as well as man, makes it possible for them to act as carriers of infection.

Being aquatic, or semi-aquatic, in the early stages of their development, it would seem that attention should be given to their breeding places, and the attack directed toward their destruction in the immature forms.

My paper is already considerably longer than I had hoped to make it, but I think it would ill become me—from the tick-infested section of the country—to close without making brief allusion to the *margaropus annulatus*, the common cattle tick, or fever tick, which has been, and is still, costing the country so much.

The cattle tick is not a dipterous insect, in fact, is not a true insect, like those we have just been discussing. That is, it does not have any wings, "but it gets there just the same." It belongs to the order, Acarine, and the family, ixodidae, and is the most important tick attacking cattle in North America.

As there is a large amount of available literature concerning this pest, it seems unnecessary to go into details regarding it. Suffice it to say, that the eradication of this tick from the Southern States is, perhaps, the greatest agricultural and industrial problem before the people of that section of the country today. That it can be accomplished, is evidenced by the large amount of territory already cleared of ticks and in the free area, through the cooperative effort of federal and state authorities, aided by the dipping-vat and the standard arsenical solution. Or, as some of our poetic veterinary inspectors have rhymed it:

"The dipping-vat's the famous trick
To eradicate the cattle tick."

It is a practical proposition, and only needs money to make it an absolute success. And, the more money appropriated by Congress and the different states affected, for this work, the sooner will we have a tick-free country, with the most profitable markets free and open to the product of every section of it, without let or hindrance.

This will not only benefit the southern section, in having an open market, but it

will open up a vast, rich, cattle-raising country, which will have to depend, for some time to come, upon the northern breeder of pure-bred animals to supply the demand for improved breeding stock; and it will also open up a rich field for a largely increased number of members of the veterinary profession.

The last Congress appropriated $250,000 to cover the Federal Government's assistance in this work, and it is the desire of those interested in this great uplift for the South, to make an appeal, through every available and appropriate channel, to the present Congress to increase the amount to $400,000 for the coming season.

I do not know of any investment that Congress could make that would give to the country such valuable returns; and if not out of place here, I would like to suggest, that the Illinois State Veterinary Medical Association pass a resolution recommending that the Congress appropriate, at the present session, $400,000 to further facilitate the work of tick eradication in the infested area of the country.

The Value of Physical Examination and Clinical Diagnosis in the Control of Tuberculosis in Cattle*

By VERANUS A. MOORE, Ithaca, N. Y.

AT the request of the Secretary, I consented to discuss the subject of physical examination and its value in the detection and control of bovine tuberculosis. From statements emanating from various sources it appears that there is difficulty in understanding the value and the limitations of the various methods for the detection and control of this insidious and, at the time, most serious disease of cattle. With the coming of newer methods for diagnosis there is a tendency to reject former procedures. Physical examination formed the basis of all diagnosis in the earlier years and more than any other method continues to bring into operation the power of observation and the skill of the practitioner, as distinguished from that of the herdsman. It is to be regretted that in our own country this method should now be surrounded by so many doubts and misgivings. It is in America only that veterinarians have tended to depart from this fundamental method of diagnosis.

In the development of knowledge and methods for the identification of specific diseases, there is a tendency to accept the last discovered reaction based upon some element or product concerned in the symptom-complex of the disease as the most reliable procedure. Already there are filed on our shelves many descriptions of methods that have, because of their limitations, been excluded from regular routine but reserved, perhaps, for use under certain conditions and at the proper time. For this reason, one can not intelligently follow the evolution of methods of diagnosis without feeling the great importance of clearly differentiating between the fundamental and the supplemental methods. Again, one can not read the history of diagnosis without recognizing the dependence of a one-time satisfactory procedure upon some subsequently devised method of precision. As knowledge increases diagnosis becomes more and more difficult. The close resemblance in symptoms, in lesions and even in the etiological factors, compel one to be less hasty in making positive statements.

In this country, where emphasis is constantly being placed on the most recent observations, there has come to be more or less confusion in what is meant by *physical examination* and *clinical diagnosis*. Instead of carefully differentiating between these two methods and understanding the

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value of each, our people seem to be better satisfied with snatching some element of diagnosis and surrounding it with the dignity of a method. As did the artist of old, so let us return to the schools of the masters and see what is meant by each of these methods for detecting and identifying morbid conditions.

The term "physical examination" means the systematic study of the various parts of the animal body by means of the ordinary senses. This was the only method known to the veterinary profession from the time of Claude Bourgelat in 1762 to the dawn of the newer pathological procedures a hundred years later. During this time all knowledge of specific diseases and their differentiation one from another, were based on the findings of a careful examination of the body. There developed methods of physical examination consisting in the arrangement of the knowledge of various organs. In applying this method, each system such as the respiratory or circulatory is carefully examined in every part possible so that any deviation from the normal at any point that can be reached by the human eye, hand or ear can be detected.

As disease is a variation from the normal, it is essential that before one attempts to determine a morbid condition he should know what the healthy one is. The physical examination enables one to ascertain by means of inspection, palpation, percussion and auscultation whether or not the normal condition exists and if deviations occur to ascertain in which of the anatomical systems and at what points they are located. The acquisition of the knowledge and ability to make an efficient physical examination is one of the most difficult tasks for the student of human or veterinary medicine. In the veterinary schools of Europe the teaching of this subject occupies a prominent place in the curriculum. In this country, on the contrary, we often hear teachers and practitioners refer to it with an air of contempt, and American veterinarians have become conspicuous for their disregard of this first and fundamental requirement for detecting morbid conditions.

As a physical examination has for its purpose the determination of the condition existing in any part of the living body that can be ascertained by the unaided senses, the question naturally arises as to the degree of accuracy of such examinations in identifying any particular disease. It is clear that a careful examination of the subcutaneous lymph glands would indicate whether one or more of them was enlarged. It would be difficult, in fact impossible, from that indication alone to state the specific nature of the trouble. The same would hold with abnormal findings in other parts. If, however, the morbid changes are well advanced they usually take on a form that is more or less characteristic of the disease they represent. This is not always true, for not infrequently diagnosis based on such findings proves to be erroneous. There are certain specific diseases such as tuberculosis, actinomycosis, glanders and some others that can be identified in a very large percentage of cases when the tissue changes have advanced to a certain stage. If the nature of each of the diseases is thoroughly understood, it is possible from the course, location and general character of the lesions to be reasonably sure of the particular disease present. The degree of accuracy of such a diagnosis, is necessarily determined by the knowledge possessed by the examiner of the course of the disease and the relative frequency of other causes giving rise to apparently like conditions. In all cases the positive diagnosis depends on special tissue changes that can be determined by a microscopic examination only or by the presence of some specific reaction or the etiological factor. The diagnosis, therefore, by physical examination in case of specific diseases is presumptive. This presumptive diagnosis stands in exactly the same position as other presumptive tests employed in laboratory work. Thus in the analysis of water the fermentation of certain carbohydrates with the production of a definite quantity of gas and acidity is a presumptive test that the colon bacillus is present; the finding of acid fast bacteria in a microscopic examination of milk or excreta would be a presumptive test for tuberculosis; a normal temperature in a certain percentage of cattle following

the use of tuberculin is presumptive that such individuals are free from tuberculous infection, yet no one familiar with these subjects would be positive as to the accuracy of the diagnosis from the findings of such examinations alone. In like manner the presence of obvious tissue changes suggestive of tuberculosis warrant the same degree of consideration as other presumptive tests which are accepted as sufficient evidence for action.

With the growth of definite knowledge of the cause, tissue reactions and tests for specific diseases methods for positive identification supplemented the findings on physical examination. The combination of these constitutes the "clinical diagnosis."

Clinical diagnosis means, therefore, the finding of morbid conditions on physical examination and identifying the disease by any means or test that may be applied to the living animal, such for example as microscopic examination of excreta, chemical analysis of secretions or specific reactions. The terms physical examination and clinical diagnosis are often erroneously used as synonyms. A careful study of the literature will show that the specific tests which are often considered in this country as special methods are really but fragments of the various mechanisms or technic employed in clinical diagnosis. It is well, therefore, to recognize that physical examination and clinical diagnosis may be like two variables gradually approaching the same limit.

The question before us is, To what extent can tuberculosis be controlled by the use of physical examination only? As the first element in control is diagnosis, the question resolves itself to the determination of the extent and accuracy of the physical examination in making the diagnosis. As tuberculosis in most cases is a local or localized disease which develops slowly, often requiring years for its manifestation, it is obvious that its presence can be detected in very few cases at any one time. Again, as tubercles often develop first in the mesenteric glands, liver and other deep-seated organs where ordinarily they can not be detected until the organs themselves become sufficiently affected to interfere with their function, and further, as minute lesions can not be detected in the subcutaneous lymph glands, lungs or udder, their presence can not be determined on physical examination in the early stages of the disease. In animals where the lesions can be detected, positive diagnosis is impossible without confirmation by some of the methods included in clinical diagnosis such as a bacteriological examination or the application of tuberculin. In other words, the physical examination makes possible a presumptive diagnosis in those cases where lesions can be located.

The significance of the physical examination, however, is not measured by the percentage of infected individuals it will detect. Its true value rests in the fact that the few cases which can be detected by it represent the greater number of the immediately dangerous animals—those that are actually eliminating the specific bacteria or are liable in the near future to do so.

It is not presumed that a physical examination will detect every case that is spreading the infection but it is known experimentally that it will find most of them. The physical examination if properly made and repeated at short intervals will detect most of the animals as fast as the lesions approach the stage where they become a menace. If all such animals are removed, slaughtered or isolated, the chances for the disease spreading to other animals in the herd, especially to the calves, are wonderfully reduced. We have records where badly infected herds have been determined by repeated tuberculin tests, by frequent inspection and the removal of all suspicious cases. Both Ostertag and Poels affirm that if carefully applied a system of physical examination with the prompt removal of the suspicious cases will check the spread of the disease, allow healthy calves to grow up, and replace the diseased animals with sound ones. The fact must ever be borne in mind that the physical examination will not detect the occult cases. For detecting these, tuberculin must be used. Physical examination affords little protection against the transmission of tuberculosis from one herd to another.

In applying a method, in a system of control, that will detect at any one time but

a small percentage of infected individuals it is necessary to understand the situation in its entirety. The extent and nature of the disease must be reckoned with. The capriciousness of tuberculosis, especially in its earliest stages, regarding its progress and arrest, renders it impossible to state what a considerable percentage of tuberculin reacting animals will do. When, however, lesions have developed to the point where they can be detected, all admit that such animals should be removed from the herd. Fortunately it is being clearly demonstrated that in some cases it is possible to detect the presence of the lesions before they discharge the specific bacteria. If, therefore, the examinations could be carefully made at short intervals suspicious cases could be removed before damage was done. It means that the spread of the virus is largely if not entirely checked and that gradually the infected animals will be eliminated. Tuberculosis can be likened to a weed in that it is the product of a certain definite seed. A weed-free garden is not made so at once, but so fast as the weeds appear above the ground and before they have produced seed, they are destroyed by the gardener. Eventually all the seed that will germinate have manifested themselves and been removed; thereafter weeds will not appear if care is taken not to introduce more seed from without.

The physical examination in this country should include all that the Germans hope for by the clinical diagnosis. They find the suspicious case on physical examination and then proceed with methods of precision to make a positive diagnosis. We should remove the suspicious cases and if they are kept they should be held in quarantine until the positive diagnosis is made. If this were done, the physical examination here would mean all that the clinical diagnosis means in Germany. If this were applied to all herds it would be a great addition to the present methods in eliminating tuberculosis.

We are not wise guardians of the health of the cattle, to say nothing of our responsibility to the children of the land, if we do not recognize the truth regarding the nature and distribution of the disease in question. The facts are that tuberculosis is wide-spread in our dairy districts and that in many herds a large percentage of the cattle is infected. The effort to control this disease by legislation has been centered on the elimination of all infected animals regardless of the stage of the lesions. The appropriations for indemnity and cost of testing have in general not permitted the thorough and repeated tests of all the infected herds and slaughter of reacting animals. In many states, not more than one to five percent of the cattle are tested annually and the reactors removed. While a great deal is being said about the control of tuberculosis, the actual purification of tuberculous herds is progressing very slowly in many badly infected districts. Meantime the disease is continuing to spread after its own methods in a large number of herds. Great emphasis has been placed on a few herds while the greater number remain untouched.

There is no question but that the tuberculin test applied and properly repeated to all herds with the slaughter of the reactors would be the quickest way to eradicate tuberculosis. There is no doubt of the statement that badly diseased herds have been purified and in localities where there is but little tuberculosis the method of testing now in vogue has been successful and is to be urgently recommended. The actual conditions, however, that exist in a majority of dairy districts demand that the spread of the disease be checked in more than from one to five percent of the herds. It is because of existing conditions in the great dairy districts that it seems desirable to add to the more stringent methods that are being applied in a few herds some measure to eliminate from all herds the cows with recognizable tuberculosis of the lungs, intestines, uterus and udder. Check the spread of the virus in every dairy herd, should be the slogan of the livestock sanitarian. Until public sentiment changes and legislatures find ways and means for providing indemnity, and breeders see their way to supply healthy stock, we can not hope for the successful enforcement of stringent tuberculin testing laws and the removal of all reactors. If a general system of careful physical examina-

tion is enforced and all suspicious cases removed at least most of the spreaders would be eliminated. It is for this reason that I believe a general physical examination added to existing efforts would be most helpful. It is not advocated as a panacea but as a valuable adjunct to present methods in combating this disease. Why not apply some method that will check its spread in tens of thousands of tuberculous herds where under existing conditions nothing is being accomplished?

The educational value of the physical examination is very marked. In my own city the appointment of a veterinary dairy inspector last June has already resulted in the elimination of a number of advanced cases of tuberculosis and the request from the owners of several herds for the tuberculin test. Judging from experience, and the reports of scientific investigations I am personally convinced that a general, frequent, honest and skilled physical examination of dairy cattle and the exclusion of advanced and suspicious cases would hold tuberculosis in check and in many herds eliminate it absolutely. It is important to recognize always where the value of a physical examination begins and ends. The following seems to be determined:

1. A physical examination will enable a skilled examiner to detect advanced cases of tuberculosis in cattle.

2. It will enable one to detect the presence of lesions in less advanced cases so that the *suspicious* animals can be removed.

3. The physical examination will not detect more than from one to five percent of the infected animals at any one time. For this reason its value is very largely restricted to the intra-herd control of the disease.

4. A physical examination can not be relied upon to detect all infected cattle and consequently it is of little value in inter-herd control. For this protection tuberculin is the only diagnostic agent we have.

5. Finally, a physical examination will detect, if properly carried out, from eighty to ninety percent of the animals which are actually spreading the virus.

Immunization Against Hemorrhagic Septicemia*

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THE term, hemorrhagic septicemia, was first applied by Hueppe in 1886 as a collective name for all those diseases which were caused by the ovoid bacterium, the Bacillus bipolaris septicus. The designation of Hueppe included chicken cholera, rabbit septicemia, hemorrhagic septicemia of cattle and swine plague as the original group. Later investigation proved that there are a number of other infectious diseases in animals which directly or indirectly are etiologically identified with the Bacillus bipolaris septicus. Thus, this organism was found to be responsible for the buffalo disease (so-called Barbone), infectious pneumo-enteritis of sheep, and the infectious pleuro-pneumonia of calves. This enumeration of diseases does not embrace all affections in which this germ is involved, as there are other infectious maladies such as influenza of horses, catarrhal pneumonia of calves, and distemper of dogs in which the ovoid bacterioum is held to be an important factor. Its association with the latter diseases, however, has not yet been satisfactorily established; nevertheless it is known that some of the pathological changes observed are caused by this microorganism, and at least it must be considered in these instances as a secondary invader.

All species of domestic animals are susceptible to the infection, although the pathogenic action of the organism for a certain species is usually higher than for other species, and under certain conditions

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may even be absent; nevertheless it is known that under appropriate conditions the organism may gain in virulence and become a typical pathogenic agent for any of the species. Thus it has been observed that after an outbreak of hemorrhagic septicemia in cattle, hogs have become affected with swine plague on the same premises, and likewise the disease in sheep has developed subsequent to an infection of hogs.

It is therefore apparent that the group of these diseases is caused by the same germ which possesses only a variance in virulence for the different species of animals. This fact is also substantiated by the morphological and biological characteristics of the germ.

These ovoid bacteria live as saprophytes but under the influence of certain conditions they become parasitic, in which state they sometimes attain a very high virulence. After some generations they gradually lose their parasitic nature and return to their original saprophytic state. As parasites in their passage through the animal body they show certain characteristics as a result of which they are known as a variety of the Bacillus bipolaris septicus. Thus, as a rule, the diseases of the different species of animals are caused by these specific varieties, viz., the hemorrhagic septicemia of cattle by the B. bovisepticus, swine plague by B. suisepticus, chicken cholera by avisepticus, the disease in sheep by B. ovisepticus, etc.

These varieties, however, have a common saprophytic origin which justifies their being grouped into one family, and all diseases caused by microorganisms with the following characteristics should be included in this group: ovoid bacteria without motility, Gram negative, polymorphous with involution forms. They do not liquefy gelatine, and do not coagulate milk nor change its reaction. The bouillon cultures have a peculiar odor. On acid potatoes they form no visible growth and in pancreatic bouillon no indol is formed; they are usually aerobic, but may grow anaerobically. They produce no spores and have no flagellae. They possess a greatly varying virulence which is usually very high. These specific characteristics are invariable and the absence of any of those enumerated would exclude the organism from the hemorrhagic septicemia group.

The group relation of the organisms of this family is also substantiated by the following observations: chickens may be immunized against chicken cholera with cultures of the rabbit septicemia organism with the same satisfaction as with the attenuated cultures of chicken cholera (Kitt). Likewise Jensen immunized chickens against cholera with the bacteria of calf septicemia. Mayr and Kitt immunized rabbits against swine plague and chicken cholera with sera of the latter diseases. Perroncito produced a fatal septicemia in calves with inoculations of the swine plague organism. Galtier found swine plague bacteria infectious for sheep, goats, calves and horses. Voges has even succeeded in producing a disease as fatal as cholera in chickens by feeding them swine plague bacteria. Further, it has been proven that in spontaneous outbreaks, hogs may become affected with the virus of chicken cholera. Finally, Lignieres in his exhaustive experiments proved the virulence of the hemorrhagic septicemia organism for all domestic animals, in which the most varied clinical picture may result from the infection.

These together with the findings and observations of other investigators have established the close relationship of the different varieties of organism of this group. Moreover through this knowledge it has been possible to prepare a polyvalent vaccine from the different varieties which gave satisfactory results in the combating of outbreaks and which is still being recommended and employed in various localities.

Immunization against various forms of hemorrhagic septicemia has engaged the attention of numerous investigators since the time the causative factor was identified. Pasteur was the first to work out a method for immunization against chicken cholera which, however, failed to come up to the desired expectations. He employed for the immunization an attenuated culture of the chicken cholera organism. The attenuation was accomplished by exposing the cultures to atmospheric air for a certain length of time. He found that cultures

subjected to these conditions lost their virulence to a certain degree if they were then cultivated at body temperature. The material obtained from this attenuation was then used for the immunization against chicken cholera. The failure of this method in practice can be attributed chiefly to the fact that cultures exposed to this method of attenuation will not in all instances produce a uniform product, and therefore it can be readily understood why in some instances great losses were sustained from the use of such vaccine.

Later, other investigators prepared vaccines for the immunization of the different varieties of these diseases and while the results were encouraging they have not in all instances succeeded in their purpose. Lignieres' method appears to have been the most satisfactory and its utilization in practice has also been probably more extensively adopted than any of the other methods. The method of attenuation he employed consists of growing the cultures of the respective organism as 42 to 43° C., and preparing from the cultures grown at this temperature two different strengths of vaccines. The weaker vaccine is grown for five days at this temperature, whereas the stronger vaccine for the second injection is grown for only two days.

Kitt was the first to establish that the attenuated vaccine prepared from one of the varieties of the germ may also prove effective against other varieties. The proof of this fact is of very great importance in the control of the disease since it may not make material difference whether the vaccine used originates from the bacteria of the particular variety it is desired to immunize against or another variety. Thus, it is possible to immunize chickens against cholera with the vaccine prepared from the organism producing rabbit septicemia.

On the other hand, it must be recognized that immunization against a disease of this group cannot invariably and uniformly be successful with vaccines from another variety of the disease, and it should therefore be considered that the best results can only be expected when the vaccine is prepared from the organism of the same variety. Hence, in all cases where it is possible to employ an autogenic vaccine such should be used. The preparation of the polyvalent vaccine is highly recommended by Lignieres, and according to his experience it may be used with satisfactory results in practice. The polyvalent vaccine is prepared from a mixed culture of the hemorrhagic septicemia organisms originating from sheep, cattle, dogs, horses, hogs and chickens. The culture is grown under the attenuating influences of a high temperature as described above. The practical application of the polyvalent vaccine is at the present time receiving the recognition of certain workers in the control of the disease among various species of animals.

The serum immunization against these diseases has also been investigated quite extensively. Potent sera can be prepared which will have an immunizing effect against the respective disease, but the application of this method of immunization in practice has not proven practical since a serum inoculation produces only a passive immunity which conveys to the animals a resistance that remains for only a relatively short period.

In consideration of the laborious task of preparing a horse to furnish the potent immunizing serum and also the length of time which this preparation requires, one can readily see the advantage which would be derived from a vaccine in preference to an immune serum. This feature was particularly emphasized in a recent experience where it was necessary to immunize animals within the shortest possible time in order to prevent further losses from the disease in a buffalo herd.

In the following report our experience with vaccine immunization against hemorrhagic septicemia is described, and in consideration of its success, further applications of this method in outbreaks of hemorrhagic septicemia among other species seem advisable.

Hemorrhagic Septicemia of Buffalo (Barbone)

During the month of December, 1911, the Department of Agriculture received information from the Department of the Interior of the existence of a fatal disease in the buffalo herd in the Yellowstone National Park with the request that an

expert be sent to make an investigation of the disease.

Dr. E. J. Cary, veterinary inspector of the Bureau of Animal Industry, was detailed to carry out the investigation at the Park. In all twenty-two animals died between December 3 and December 15, young animals especially being victims of the disease. The symptoms and particularly the postmortem findings were confusing and it was therefore deemed advisable to forward some of the tissues for diagnosis to the Pathological Division. The bacteriological examination as well as test inoculations proved an infection with hemorrhagic septicemia as the specific microorganism (Bacillus bipolaris bubalisepticus) was isolated from all tissues, and test animals which were inoculated with material from the specimens died of typical hemorrhagic septicemia, the specific organism being also recovered from their blood.

This disease of buffalo, known also as barbone, was first recognized in Italy in 1886, while three years later its presence was established in Hungary. No previous outbreak of barbone has been recorded in this country. In Russia, Egypt, Indo-China, and the Dutch West Indies, the disease occurs frequently in enzootic form and in the latter place over 11,000 buffaloes succumbed between 1888 and 1891. It usually appears as a disease of the soil in marshy pastures where large numbers of buffalo are kept. Its appearance in such a remote and isolated place as the Yellowstone Park, however, is difficult of explanation, although the bacilli are known to be widely spread in nature and to occur not infrequently in the digestive tract and air passages of healthy animals. As a result of certain unknown conditions which might include those influences that weaken the resistance of the tissues, as exposure, starvation, anemia, etc., the bacilli become virulent and produce characteristic lesions. It is not an uncommon experience with hemorrhagic septicemia to have it appear periodically in certain localities without any apparent connection to which the introduction could be traced. The appearance of the disease in sheep reported by Ward in Minnesota might have some bearing on the disease in Wyoming, but if so it would probably be through birds of prey such as buzzards and hawks.

The authorities in charge of the buffalo herd at the Yellowstone Park were immediately notified of the nature and cause of the infection among the animals and preventive measures were recommended for controlling the spread of the disease. At the same time it was deemed advisable to undertake the vaccination of the entire herd with bacterial vaccine prepared from the recovered organism. For this purpose two vaccines were prepared of different strength. The vaccine for the first inoculation was prepared by growing the organism five days at 42.5° C., while the vaccine for the second injection was cultivated in the same temperature for only two days.

For the preparation of vaccine Erlenmyer flasks of pepton bouillon media were inoculated with the organism after it had been cultivated for several generations on agar, and the bouillon cultures were then placed under temperature conditions stated above. The straight attenuated culture after thorough shaking was used for vaccinations in some of the animals, while others received the same vaccine to which one-half of one percent of carbolic acid had been added. This was undertaken in order to determine whether the preserved vaccine possesses the same immunizing qualities as the unpreserved material.

Two varieties of the hemorrhagic septicemia organisms were utilized for the preparation of vaccine, the one strain representing the germ isolated from the buffalo disease in the Yellowstone National Park, while the other was a variety of hemorrhagic septicemia of cattle isolated from animals which died of that disease in Colorado. The vaccines prepared from these two varieties were tested for their potency on laboratory animals and also on sheep, a comparison of the action of the two different vaccines being carefully made.

The virus isolated from the buffalo disease was especially virulent for rabbits. Inoculations of these animals with 1 Cc. of a suspension of salt solution containing only 1-15 of a loopful of bouillon culture killed the animals in from 12 to 18 hours, while 1-20 of a drop of blood from rabbits dead from the disease was fatal to other

rabbits in less than 24 hours on subcutaneous inoculations. The virus of the cattle variety was not as virulent, although test animals succumbed to subcutaneous inoculations on the third day, showing on postmortem examination the characteristic manifestations of the disease.

Both strains of vaccines were employed in parallel tests on a group of rabbits and also at the same time on sheep. For immunizing purposes subcutaneous injections of the vaccines were given to the animals at ten-day intervals. For the first vaccination the more attenuated, and for the second vaccination the less attenuated vaccine was injected. The injections invariably were made subcutaneously on the inside of the thigh. The dose for the rabbits was .2 Cc. per injection, while the sheep were given .7 Cc. of each vaccine. Likewise another series of animals was tested, using the same amount of vaccine which was preserved with 0.5 percent carbolic acid.

On the sixth day following the second inoculation the immunized animals were given a subcutaneous injection of the pure culture of the organism. Those which were immunized with the buffalo variety were injected with the virulent culture of this organism, while the others received the cattle variety. At the same time check animals which were not immunized were employed for each group and these were injected with the same quantity of virulent culture as given to the immunized animals. The immunized rabbits failed to show any indication of disease from the injection of the virulent culture, while the control animals succumbed in the usual time. The same results were noted in the sheep, although one of the immunized animals showed a slight elevation in temperature which, however, subsided after one day. On the other hand, the control animals of this group succumbed to the infection with typical symptoms and lesions of the disease. The fact that the animals immunized with the carbolized vaccine showed the same immunity as those immunized with the straight attenuated cultures is an interesting feature of this experiment, and while this condition appears at first hand to indicate the advantage from the use of the preserved vaccine, subsequent complement-fixation tests undertaken on these immunized animals showed that those animals which were immunized with the straight vaccine gave a partial fixation of the complement for a much longer period than those which were immunized with the carbolized vaccine.

The results of these tests further substantiate the view that the vaccines of one of the varieties of the organism are potent against diseases produced by the other varieties of the germ. Thus, rabbits and sheep were successfully immunized with the vaccines prepared from the Bacillus bubalisepticus and the Bacillus bovisepticus.

After obtaining these favorable results the vaccine was sent to the veterinarian entrusted with the vaccination of the buffaloes, and instructed to vaccinate all animals of the herd by the same procedure at ten-day intervals. One cubit centimeter of the vaccine constituted a dose for each animal.

Following vaccination, the herd was carefully observed and no immediate effects were noticed from the vaccination, and up to the present time there has been no indication of the recurrence of the disease among the buffaloes.

In the progress of the preparation of the vaccine experiments were also conducted in the laboratory to determine whether the complement-fixation test could be applied for the diagnosis of the disease, and also for the purpose of determining the relative degree of immunity conferred upon the vaccinated animals in artificial immunizations. An antigen was prepared from the original organism recovered from the outbreak among the buffalo in the form of a shake extract. The hemolytic system consisted of sensitized rabbit serum (amboceptor), guinea pig serum (complement), and washed sheep corpuscles. The test was employed with sheep serum and rabbit serum of artificially infected animals, and the results proved entirely satisfactory. A complete fixation was obtained in all instances when applied to 0.1 Cc. of serum of infected animals, while the controls showed no fixation whatsoever.

After the vaccination of the sheep and

rabbits, blood serum was obtained from these animals and tested with the complement-fixation test. The results in these instances also showed a fixation of the complement, although not as complete as in the infected animals, nevertheless showing that the animals responded after vaccination with the production of immune bodies. This reaction has been noted even three months after the vaccination, and the testing of the blood will be continued from time to time in order to determine the length of the period in which the animals possess immune bodies subsequent to vaccination.

The utilization of the complement-fixation test in the diagnosis of hemorrhagic septicemia, and also its value in determining the relative immunity established by vaccination is of great importance, not alone in this disease, but also in the possibility of its utilization for other diseases.

Veterinary Matters in Australia

By J. R. SHAND, Fort Wm. McKinley, Manila, P. I.

AT the request of the editor to report my trip through part of the Orient and the Antipodes, I submit the following:

In the first place I might just state what occasioned this nine-month trip.

I had been stationed at Zamboanga Moro Province, P. I., for one year as Quartermasters' veterinarian and besides enjoying practice on the side I was also veterinary inspector of the Port and Contagious Diseases District of Zamboanga, and meat inspector for the municipal government I was on three pay rolls and still had time to do outside work.

After the completion of one year at this place I was transferred to Malabang, same province, with two additional posts to look after, viz., Parang and Camp Vicars. I had never cared for the country around Malabang, as it is the last place in the world, with no opportunity for outside practice, besides being infested with bad Moros, having no white women, etc., etc., so I wrote out my resignation, to take effect in five weeks. I went to Malabang for the five weeks, returning to Zamboanga at its expiration, and started out for Perth, West Australia.

I took passage on the N. D. L. "Darvel" for Singapore via British North Borneo, leaving Zamboanga February 15th, 1911. We had a pleasant ten-day trip through Borneo, which was not interesting, as Borneo has not been very highly developed as yet.

Eight days were spent in Singapore, which is a good lively city. I met there, the Government veterinary surgeon, Mr Scott Falshaw, M. R. C. V. S., whom I found to be a fine man, and he showed me a very good time. Incidentally I was offered a very good position with the British Government, but I was bent for colder climes and I declined to accept. In Singapore I found the horse market "just a little stale" on account of the automobiles and jinrikishas. A short side trip was taken into the Federated Malay States from Singapore.

March 4th I embarked on the S. S. "Minderoo" for the long trip to Freemantle. A stop of thirty-six hours was made at Soerabaja in Java which was spent very pleasantly, but enough time was not allowed to visit any of the Dutch veterinary officers. In Singapore the beast of burden is the Indian bull, while the passenger service is handled in the main by the Chinese coolie and his riksha, excepting a few rigs drawn by small ponies. The Europeans import their horses from Australia. Rinderpest, surra and foot-and-mouth disease are generally always present in the cattle and surra in the horse, while the poor "chink" suffers from tuberculosis.

In Java again we have the Indian cattle as draft animals but no rikshas (the Malay "he no sabe pull wagon"), their place being taken by Irish jaunting carts with the seats placed the other way, drawn by small ponies about forty-eight inches high, and they are certainly "some horse-flesh." They will kill any Australian horse when it comes to work. The Dutch also, like

the English in "S'pore," import their horses from Australia and the Australians are continually shipping horses of a poor class, generally, to the Orient.

Our next stop was at Broome, N. W. Australia, famous for being the greatest pearl fishery in the world. There we loaded on 250 head of the finest steers that I have ever seen in my life. I was amazed at the great size of these animals, which were all raised in the tropical, interior N. W. Australia. We stopped at nearly all the towns along the coast and at Canarvon 500 sheep were put aboard, just ordinary sheep, and Freemantle was reached on March 23rd after an uneventful voyage, of nineteen days. I had a hundred dollars' worth of The Abbott Alkaloidal Company's drugs with me, which cost me an additional twenty percent before I got through the Customs, and then they went through as "samples," at that.

Perth is the capital of West Australia, joining Freemantle, and has about 30,000 population. Here I intended to locate and enter private practice. I took my time to study the condition so as I should not do anything rash, and here is what I found:

One graduate M. R. C. V. S., three non-graduates, and five quacks. I make the distinction between the two latter on account of the class of the men. The three non-graduates were perfect gentlemen in every sense of the word, while not as capable as the ordinary run of American veterinarians. They were very practical, but when it comes to surgery they are all at sea; still, they had all the practice on account of their beautiful veterinary hospitals, ambulances, humane tables, auto runabouts and hustling ways. The graduate was holding his head just above water and was anxious to sell out. He was an Englishman and the other three were Australians. Four other M. R. C. V. S.'s were literally "starved out." Hence Australia for the Australians.

At Northam, 80 miles east of Perth, and the center of the agricultural district, I found one M. R. C. V. S. and seven quacks, one of the latter advertised right on his hospital wall in twelve-inch letters, that he was a graduate of a non-graduates' veterinary hospital in Perth. That certainly did appeal to my sense of humor. I met the gentleman at an auction sale of stock and he told me he thought he would go to America and take a postgraduate course, and I told him that it would be a very good idea. These quacks reached out for miles in the country leaving Monday and getting back Saturday, hunting work. The graduate sat in his office and starved, the work never got near him, and the town was not large enough to support him. As that country is so young the farms so large (it takes 1000 acres to support a family), I should say four real veterinarians could do all the work nicely, but as it is now, there are two graduates and a host of quacks barely making a decent living in the whole of West Australia!

The people, men and women alike, are race horse and horse race crazy. The totaliser is licensed by the Government, which gets two percent. The "bookies" are licensed by the jockey club. The horses are chiefly imported from the eastern states (of Australia); very few are raised in West Australia.

The non-graduates are extremely successful treating the ailments of these racing machines, but the fine surgical work is not done. The financial end of treating the race horse is a question. With large owners, your check is there at the end of the month. Small owners on the other hand compel you to wait for your fee until the horse wins a race. The one counterbalances the other.

Horse raising is extremely limited in West Australia. It only amounts to a handful of race horses, a few clydes and several scrubs.

There are four government veterinarians in West Australia, whom I found to be very fine fellows, and I was always a welcome visitor at their offices. The chief offered me a position as veterinary inspector on the cattle ranges up North in the tropics with headquarters at Derby, salary $2250 and expenses, but it was too hot for me there and I would not consider it.

The cattle round the vicinity of Perth, invariably the imported ones, I found to be greatly affected by tuberculosis. One dairy that I tested showed sixty-five percent

of the cows tuberculous, but every one of these animals looked well and had the very best of care. He (the owner) claimed that the West Australia-bred cattle were practically free from the disease, but the ones imported from the eastern states were mostly infected and they obtained the infection when they were calves from the creameries, the same as is common in the United States.

I could not understand why it was that the Government didn't go ahead and clean up their State, that is, render it free from bovine tuberculosis, while the cattle industry is in its infancy, but I could never get any satisfaction from the chief veterinarian.

The cattle raised in the agricultural districts of Western Australia are practically free from tuberculosis, but the imported stock, you might say, is "rotten" with the disease, and I suppose politics is responsible for the importations of diseased animals.

Pleuro-pneumonia contagiosa is still found, mostly in the outlaying districts, a disease which in my opinion the Australians will never get rid of. The large slaughter house in Freemantle is a disgrace to the State. The place is a tumble-down wreck, unsanitary, unsightly and out of date, and lacks adequate Government supervision.

Glanders is a disease unheard of, but "shipping fever" abounds, just like it does in the Chicago stock yards, but is more aggravated here on account of the water transportation, cold winds, etc.

The Honorary Veterinarian of the Perth Jockey Club is one of the non-graduates that I have already referred to. I attach a clipping of the results of one of his autopsies:

NOTES AND CHAT
(By "Brooklyn")

At the Canning Park races on April 29 Mr. A. Wray's mare Herondale (Benvolio—Meeki) was to have contested the Third-class Plate, and F. W. Cracknell was to have ridden her, but when about to leave her box the mare dropped dead. The matter was reported to the stipendiary stewards, who asked the club's honorary veterinary surgeon, Mr. A. MacIntosh, to hold a postmortem with the object if possible of ascertaining the cause of death. Mr. MacIntosh, in the presence of the club's surgeon (Dr. A. J. Nyulasy) made the postmortem the following day and reported the result to the stipendiary stewards. Although Mr. MacIntosh's report has not been made public, it is understood that he found a puncture wound in the neck which might have been caused by the use of a hypodermic syringe. The injection of strychnine into a horse just prior to a race is generally supposed to stimulate him and to cause him to run better than he otherwise would. However, the repeated use of the syringe is harmful, and men who have made a close study of the use of the hypodermic syringe maintain that a horse after pulling up at the end of a race has an unnatural look in his eyes, dilated and red nostrils, and generally appears to be unusually excited. Other stimulants are used besides strychnine, and experts hold that the injection of certain stimulants will prevent a horse from winning. The use of the hypodermic syringe is more common than is generally supposed. On receipt of Mr. MacIntosh's report the stipendiary stewards opened an inquiry and adjourned it to yesterday, when, after taking additional evidence, they found A. Wray guilty of doping the mare (which constitutes malpractice) and disqualified him for life. It is surmised that the immediate cause of death was not the injection of strychnine but the injection of air which was forced from the syringe before the strychnine was ejected. The air, it is thought, entered a blood vessel and in the natural course of circulation traveled to the heart, causing a stricture and death. The sentence passed on Wray should go a long way to prevent doping. There appears to be no W. A. T. C. rule specifically dealing with the use of the hypodermic syringe, but the offence amounts to malpractice. The English Jockey Club rules, however, provide for warning off Newmarket Heath and other places where the rules apply "if any person shall administer, or cause to be administered, for the purpose of affecting the speed of a horse, drugs or stimulants internally by hypodermic or other methods."

I was the first veterinarian to introduce bacterins and nuclein into West Australia, and, I believe, to trephine a horse. The former articles were pronounced marvelous by the veterinarians who saw me use them. The first case I used bacterins in was a fistula of the withers of eighteen months' standing, and having been twice operated upon. The second was a badly infected open joint in a hind fetlock which had been given up by the local men as hopeless.

H-M-C was also used first in my hands down there, and if the bacterins and nuclein were marvelous the H-M-C was simply miraculous, i. e., where the patient was a dog, but I made a d— fool out of myself every time I shot it into a horse, so now I use other narcotics when I want to use H-M-C in a horse. It has been my experience that the horse will not take as kindly to the action of H-M-C as does the dear little dog.

Notwithstanding ability, up-to-date drugs, "delivering the goods," etc., the American veterinarian is not wanted in West Australia, as British like, the Austra-

lian sticks to the Australian, and an American is a curiosity.

After putting in five months in Western Australia, I decided to return to the Philippines via the eastern states (of Australia), so I embarked on the elegant S. S. "Karoola" for Melbourne via Adelaide. Everything went well until we entered the Great Australian Bight, when we struck a storm broadside on; the ship was 7000 tons burden and had 300 tons of cargo, and of course was top heavy. The captain didn't wish to miss the mail train (but he did), and he kept the ship going fourteen knots right through, and for three days, too. Talk about seas, great big green fellows, and talk about a ship rolling. I've travelled on hundreds of ships, but I never saw one roll like the "Karoola" did. Well, to make a long story short, we finally reached Adelaide, too late for the Sydney mail, and what the captain saved on the passengers' chow, went to repair his damaged ship.

A stop of forty-eight hours was allowed at Adelaide, so I had no time to study things veterinary there, but was informed that the condition was very much like that in West Australia. Adelaide is the capital of South Australia, the most prosperous state of the five, but as South Australia is more densely populated the quacks and non-graduates were more in evidence; the former did most all the traveling work in the country. I must say that Adelaide is the nicest, cleanest, and most sanitary city that I saw in Australia, and I have never seen finer parks or a finer electric street car service in any city anywhere. Adelaide's port, Port Adelaide, is quite a contrast. It is the dirtiest, most unsanitary town that I ever visited anywhere. Even the docks are tumbling down. It puts one in mind of the lower Halsted street district in Chicago, only it is much worse.

We reembarked on the "Karoola" and reached Melbourne next day at noon after sailing through a smooth sea.

Melbourne is the capital of Victoria, also of Australia, and here is where the aristocracy and *elite* are found and where great strides ahead in the veterinary profession have been made by the State Government.

Victoria has a State Veterinary Law, and it is a strict one; the American veterinarian is cut right out, not even being allowed to take the examination. "Why?" I put the question to the chief of the Agricultural Department and received the following answer: "Because many Australian horsemen have journeyed to America, and have come back again within six months with an *American veterinary diploma* and now it is not even necessary for them to go to America; they can take a correspondence course and receive a handsome diploma through the medium of the mails." That was certainly a blow below the belt to me, but when I got back my wind, the conversation was something like this:

Q.—Have you ever seen one of these diplomas? Ans.—No.

Q.—Have you ever seen a real diploma from America? Ans.—No.

Q.—Could you tell a faked diploma from the real article? Ans.—I don't know.

Q.—What country has made the greatest strides as to the scientific advancement of the veterinary profession? Ans.—America has, I suppose.

Q.—Then why have you cut out the American veterinarian? Ans.—For the same reason that I told you before.

Q.—Do you know that the United States Government has graded all the veterinary colleges? Ans.—I have heard something about it.

Q.—Do you not think that what is good enough for the United States Government, ought to be good enough for the State of Victoria regarding veterinarians? Ans.—Well, yes, but I don't think we could control them, they would be continually slipping one over on us.

Q.—Could you not procure a list of the accredited colleges of the United States and go by that? Ans.—I have not given the matter any thought, as we see so few real American veterinarians. You are the second one that it has been my pleasure to meet, but you know the board has the power to admit the graduates from other colleges as may from time to time be approved and recognized by a regulation of the board.

A copy of the regulations of the Veterinary Board is here given. It is worth any

American veterinarian's while to read it to see how such matters are handled in the Antipodes.

VETERINARY SURGEONS ACT 1890

REGULATIONS

Whereas by the *Veterinary Surgeons Act* 1890 the Veterinary Board of Victoria is empowered from time to time to make, alter, and rescind regulations for the purpose of carrying the said Act into effect, and whereas such regulations require to be confirmed by the Governor in Council, therefore the said board doth hereby rescind the regulations made under the *Veterinary Surgeons Act* 1890, and make the subjoined regulations in pursuance of the provisions of the said Act (that is to say):—

Election of Members of Board

1. *Appointment of returning officer.*—The board shall, from time to time, appoint (and may remove) some fit and proper person who is registered as a qualified veterinary surgeon, and not being a member of the board, to be returning officer, and to conduct the election of members of the board in accordance with the provisions hereinafter made in that behalf.

2. *Date of triennial election.*—In the month of May, in the year 1891, and in the month of May, 1894, and in the month of May in every next succeeding third year thenceforward, the returning officer shall proceed to the election of seven persons, being registered veterinary surgeons of Victoria, to serve as members of the Veterinary Board of Victoria.

3. *Extraordinary vacancies, how filled.*—If any extraordinary vacancy shall occur in the board after the period of the first election hereinbefore mentioned, and before the triennial election then next ensuing, the returning officer shall, upon being notified by the board that an extraordinary vacancy has occurred, proceed to the election of a person being a registered veterinary surgeon to fill such extraordinary vacancy, and the person so elected shall hold office until the next ensuing triennial election and no longer.

4. *Returning officer to give notice of day of election and day of nomination, and of the time and place when and where nominations will be received.*—At every election of members to serve on the board, the returning officer shall give twenty-one days' notice by advertisement in the *Argus* and *Age*, or such other papers as may from time to time be approved of by the board, of his intention to proceed on a certain day, to be named in such advertisement, to hold an election of fit and proper persons to serve as members on such board, and he shall also in such advertisement name a day, being not less than twelve days nor more than fifteen days prior to the day named for holding such election, on or before which all candidates for election must be nominated as hereinafter provided, and he shall also in such advertisement name the time and place when and where such nominations will be received, and shall sign such notice and affix the date it is given thereto.

5. *How elections shall be made.*—Should the nominations exceed the number of vacancies to be filled, an election by ballot shall be held, otherwise the returning officer shall declare those nominated duly elected.

6. *Candidates to give twelve days' notice to registrar.*—Each candidate for election to serve on the board shall give the registrar at least twelve days' notice of his intention to become a candidate for a seat on the board.

7. *Returning officer to ascertain number of votes of each candidate in presence of registrar and scrutineers—Casting vote of returning officer—Candidates declared duly elected.*—The returning officer shall, on the day named in such advertisement for holding any election, having six days previously posted to every registered veterinary surgeon to his address appearing in the Veterinary Register of Victoria, a voting-paper in the form given in Schedule IV to these regulations, proceed in the presence of the registrar and of any scrutineers appointed by any candidate to open the envelope with his printed address thereon, and which have been returned to him and to take out the voting-papers therein contained, and if he is satisfied after comparing each of the signatures in such voting-papers with signatures of the voters in the signature-book hereinafter referred to and that each vote is properly given, he shall proceed to ascertain the number of such votes for each candidate, and if two or more candidates shall have received an equal number of votes the returning officer shall in each case have the casting vote. Provided always that if any person entitled to vote be unable to write the returning officer if requested by such person before the expiration of the time fixed for receiving votes, and being satisfied with the voter's identity, shall fill up for him his voting-paper as directed by the voter and obtain and attest his mark thereto and receive and deal with the same as the vote of such voter; and as soon as conveniently may be after the day of holding such election the returning officer shall give public notice by advertisement of the number of votes given to each candidate and shall declare the candidates not exceeding the number of vacancies to be filled up who have received the greatest number of votes to be duly elected as members of the Veterinary Board of Victoria.

8. *Voting-paper may become invalid—Voting-paper to be delivered to address of returning officer.*—If any voter shall suffer to remain upon any voting-paper a greater number of names not struck out than the number of members to be elected, or shall fail to attach his signature thereto, the vote given in an by such paper shall be rejected by the returning officer. The voter shall enclose such voting-paper in an envelope furnished to him with the printed address of the returning officer thereon, and shall cause the same to be received by the returning officer before the hour fixed for holding such election.

9. *How candidates may retire.*—If any person who shall duly have become a candidate for such election desire to retire before the day of holding such election from such candidature, such candidate, not later than eight clear days before the day of holding such election, may sign and deliver a notice stating that he so retires, and the returning officer on receipt of such notice shall omit the name of such person so retiring from the voting-paper, and if the number of candidates shall by such retirement be reduced to the number of members to be elected, the returning officer shall declare the remaining members duly elected.

10. *Appointment of scrutineers.*—Each candidate shall be entitled to appoint, in writing, one scrutineer to be present when the returning officer shall open the envelopes containing the voting-papers on the day of holding the election.

PROCEEDINGS OF THE BOARD

11. *Election of president.*—The president shall be elected at the first meeting after the election of the board by a majority of the members present, and if for want of a quorum, or from any other cause, a president shall not be elected at such first meeting he shall be elected at the next meeting, a week's notice having been given by the registrar to each member of the board.

12. *Meetings of board—Special meetings.*—The board shall meet at least once a month at the office of the registrar, 43 Bourke-street west, Melbourne, or some other suitable place appointed by the board, or oftener as the president or any two members of the board shall desire by requisition, in writing, addressed to the registrar, who shall thereupon summon the members of the board to meet on the day at the time fixed by such requisition, and the registrar shall give at least three clear days' notice; in writing, by post to their addresses in the register, to each member of the board of all meetings to be held.

13. *Meeting to lapse when quorum not present.*—If at the expiration of thirty minutes after the hour appointed for the meeting of the board there shall not be a quorum of members present, no business shall be transacted, and the meeting shall lapse.

14. *Order of business.*—At every meeting of the board the first business thereof shall be the reading and putting a question for the confirmation of the minutes of the proceedings at the previous meeting, and no discussion shall be permitted thereon except as to the accuracy as a record of the proceedings; such minutes when confirmed shall be signed by the president or chairman presiding at the time of confirmation. After signing the minutes as aforesaid the order of the business of the meeting shall be as follows, unless altered by a resolution of the board to that effect:

1st. Reading copies of letters sent by the authority of the board.
2nd. Reading letters received, and considering and ordering thereon.
3rd. Payments.
4th. Ordinary business, including postponed or adjourned business.
5th. Motions of which a week's notice has been previously given.
6th. New rules or amended regulations of which twenty-eight days' notice have been given by the mover.

15. *Seal of the board.*—The board may adopt, by resolution, a seal as and for the common seal of the board.

16. *Custody of seal.*—The registrar shall have custody of such seal, which shall be deposited in the office of the board, and shall not be used except as hereinafter provided.

17. *Seal, how affixed.*—The seal of the board may be affixed by the registrar in the presence of a member of the board to any instrument or writing when authorized by a resolution passed for that purpose, and entered upon the minutes of the proceedings of the board but not otherwise.

18. *Certificate of seal.*—Whenever the seal of the board is affixed as hereinbefore provided the registrar shall append thereto his certificate that it has been affixed by order of the board with the date of such order as follows:—

Affixed by order day of 18
Registrar.

day of 18 .

19. *Form of diploma.*—The board shall issue a certificate of qualification, to be called a diploma, to duly qualified veterinary surgeons being persons who shall be qualified by examination under this Act, and such diplomas shall be signed by the president and members of the board, examiners, and registrar, and shall have affixed thereto the common seal of the board and shall be in the form specified in Schedule I to these regulations.

20. *Seat of member, how vacated.*—If any member die, or, by notice under his hand delivered to the president or registrar, resign his office as member, or become incapable of becoming a member, be or be declared ousted of such office by the Supreme Court, or be absent from four consecutive ordinary meetings of the board without leave obtained from the board in that behalf, then in every such case the office of every such member shall become vacant, and every such vacancy shall be an extraordinary vacancy and notified to the returning officer by the board.

REGISTRAR AND REGISTRATION

21. *Duties of registrar.*—The registrar shall be in attendance at his office at such hours as from time to time may be appointed by the board for that purpose, and be present at all meetings of the board. It shall be his duty to superintend the affairs of the board under the directions of the board. The registrar shall keep the books in a neat and orderly manner, he shall conduct the correspondence and issue all summonses, take the minutes of all the meetings for business, and read them and make a report of all matters that come under his cognizance for the information of the board. He shall consult the president in any business requiring attention between the various meetings and be responsible for the safe custody of all the documents and property belonging to the board which shall be under his control, and he shall find security in the sum of One hundred pounds sterling in some fidelity or guarantee society, the premium upon which shall be recouped to him by the board.

22. *The registrar to receive all fees, fines, etc.*—The registrar shall receive all fees, fines, subscriptions, donations, and other moneys which may be imposed or become due or payable under the *Veterinary Surgeons Act* 1890, or under these regulations, for which he shall give a printed receipt and no other for the same, retaining the block counterpart of such receipt. He shall, once in each week, pay over to the treasurer the amount of money received by him during the week, and obtain the treasurer's signature upon each block counterpart for the money therein mentioned.

23. *Registrar to preserve certificates.*—The registrar shall receive and preserve certificates, cards, or tickets issued by the examiners signifying that examinations have been passed.

24. *Form of register for veterinary surgeons.*—The registrar shall keep "The Veterinary Register of Victoria" in the form prescribed in the Second Schedule to the *Veterinary Surgeons Act* 1890.

25. *Signature of registered veterinary surgeons.*—The registrar shall from time to time keep and maintain a signature-book, containing the signature of each and every registered veterinary surgeon, which shall be arranged in alphabetical order, and shall produce such book for the inspection of the returning officer appointed by the board on the day of the holding each and every election provided for by these regulations.

TREASURER

26. *Appointment of honorary treasurer.*—The board may from time to time appoint one of their number as honorary treasurer, who shall find security in the sum of One hundred pounds sterling, and may pay to such honorary treasurer, out of the moneys accruing under this Act, a sum sufficient to recoup him for any premiums he may have to pay to any fidelity or guarantee society for obtaining such security as aforesaid.

27. *Duties of treasurer.*—It shall be the duty of the honorary treasurer to receive all moneys from the registrar, and to lodge the same in some bank appointed by the board, to the credit of an account, headed "Veterinary Board of Victoria," and to pay by cheque, signed by the treasurer and two members of the board, such accounts as the board may from time to time order by resolution, which shall specify the sums of money to be paid and to whom.

28. *Monthly statement of treasurer and annual balance-sheet.*—The treasurer shall present to the board a monthly statement showing the receipts and expenditure for the past month, and he shall also, in the month of January in each year, prepare and present to the board an annual balance-sheet showing the exact financial position of the affairs of the board.

AUDITORS

29. *Appointment of auditors and term of office.*—The board may appoint, in the month of March in each year, two fit and proper persons as auditors, who shall hold office until the month of March in the following year, and the board may pay out of the moneys accruing under the *Veterinary Surgeons Act* 1890 a fee of Two pounds two shillings to each of such auditors.

30. *Duties of auditors.*—The auditors shall inspect the books and accounts of the board, and examine the annual balance-sheet prepared by the treasurer, and shall certify to the same if correct. and they shall also investigate and examine all contracts, accounts, invoices, parcels, bills, and vouchers in anywise relating to or concerning the same which may be kept by or in the possession of the treasurer and registrar, and they shall also examine the bank pass-book, and ascertain that it corresponds with the account of the board in the bank, and they shall present an annual report to the board stating the result of their inspection and examination.

EXAMINERS

31. *Appointment and payment of examiners.*—The board shall before each examination appoint a sufficient number of fit persons to act as examiners, and may pay out of the moneys accruing under the Act such fees as they may from time to time determine to any examiner other than a member of the board.

32. *When examinations shall be held.*—The examiners shall meet as often as may be required for the purpose of conducting examinations, at such time as may be directed by the board, and such examiners' report shall be submitted to the board at the next meeting immediately following the same.

33. *Examiners' reports.*—The registrar shall receive and submit to the board reports and other documents issued by the examiners in connection with all examinations.

EXAMINATIONS

34. *Students to pass four examinations.*—Students shall be required to pass four examinations, and shall be required to pass in all the subjects at each examination hereinafter mentioned before being eligible for the next succeeding examination.

35. *When examinations shall be held.*—Two examinations shall be held each year, i. e., in June and November, and students shall be examined in the written before the oral and practical portion.

36. *Subjects for first examination.*—At the first examination a student shall be examined in—(1) Elementary Anatomy; (2) Practical Chemistry and Elementary Physics; (3) Biology (Elementary Zoology and Botany).

37. *Subjects for second examination.*—At the second examination a student shall be examined in—(1) Anatomy of Domesticated Animals; (2) Physiology and Histology; (3) Veterinary Hygiene Sanatory Science, Dietetics, and Stable Management.

38. *Subjects for third examination.*—At the third examination a student shall be examined in—(1) Morbid Anatomy, Pathology, and Bacteriology; (2) Materia Medica, Pharmacy, Therapeutics, and Toxicology; and (3) Principles and Practice of Shoeing (practical and oral examination only).

39. *Subjects for fourth examination.*—At the fourth and final examination a student shall be examined in—(1) Principles and Practice of Veterinary Medicine; (2) Principles and Practice of Veterinary Surgery; (3) On the examination of horses and cattle as to health and soundness, and on meat inspection. (Practical and oral examination only.)

40. In each subject prescribed for examination (except when hereinbefore otherwise specified) a written examination *shall* be held, and an oral or practical examination may be ordered by the board; the written examination to extend over not less than one (1) hour, and the oral or practical over not less than fifteen (15) minutes.

41. *Terms to be used by examiners.*—The terms to be used by the examiners in their certificate or record of examination are "Very Good," "Good," "Sufficient," and "Fail."

42. *The value of terms used.*—A student awarded a "Very Good" in each of the three subjects at each examination shall be passed with "First Honors"; a student awarded a "Good" in each of the three subjects at each examination, or terms of greater value and below three "Very Good," shall be passed with "Second Honors"; a student awarded a "Sufficient" in each of the three subjects at each examination, or terms of greater value but including either one or two "Sufficients," shall be passed. A student awarded a "Fail" on any of the subjects at any examination shall fail in such examination.

43. *President to attend examination.*—The president, or senior member of the board deputed by him, will be expected to attend and superintend the examinations once at least in the year.

FEES

44. *Fees, Schedule III.*—The scale of fees specified in Schedule III to these regulations shall be those payable to the registrar of the board before examination or registration, as provided by section 14 of the *Veterinary Surgeons Act* 1890, in lieu of, and in substitution for, the fees specified in the Second Schedule to the said Act.

45. *Appropriation of fees.*—The board shall be at liberty, out of any moneys coming to its hands under the provisions of the *Veterinary Surgeons Act* 1890, or of these regulations, to pay and discharge all costs, charges, and expenses, debts,

liabilities, and obligations incurred by it howsoever in connection with framing these regulations or carrying out the provisions of the said Act and regulations, and all matters and things done thereunder.

APPLICATIONS FOR REGISTRATION

46. *Schedules V and VI.*—Every application for registration shall be in the form of a declaration by the applicant, showing that he is entitled thereto under the provisions of the *Veterinary Surgeons Act* 1890, supported by such corroborative evidence as the board may in each case, in its absolute discretion, require; and the application of a person other than a member of the Royal College of Veterinary Surgeons of Great Britain, or of any college or school recognized by the board, shall be in the form prescribed in Schedule V and shall be supported by a declaration in the form prescribed in Schedule VI to these regulations; and every applicant shall, before registration, sign his name in the registrar's signature-book hereinbefore referred to.

47. The veterinary colleges and schools whose certificates or diplomas of competency as a veterinary surgeon will be recognized by the board are the following:

The College of Alfort, at Paris, in France.
The College of Lyons, in France.
The College at Berlin, in Prussia.

And such other colleges and schools as may from time to time be approved and recognized by a regulation of the board.

48. The board shall, on approval of the application and payment of the proper fees of a person entitled otherwise than by examination or by registration under the said Act, grant and cause to be issued to him a certificate of registration in the form specified in Schedule II to these regulations under the seal of the board.

The above regulations were made by "The Veterinary Board of Victoria" this 15th day of December, 1897, as witness the signatures of a quorum of the said board.

W. T. KENDALL, President
S. S. CAMERON, Chief Dept. Agric., M. R. C. V. S.
R. NICHOLLS, Member
H. A. M. CHRISTOPHERS, Registrar

SCHEDULE I.

Veterinary Surgeons Act 1890

DIPLOMA ISSUED BY THE BOARD

Know all men by these presents that the examiners appointed under the *Veterinary Surgeons Act* 1890 having examined Mr. ——, the Veterinary Board of Victoria hereby declare him to be fully qualified to practise the art and science of Veterinary Surgery and Medicine.

By order of the Board.

President
Members of the Board Examiners

(SEAL)

Registrar

SCHEDULE II

No. Register.
Veterinary Surgeons Act 1890, Victoria No. 1154

CERTIFICATE OF REGISTRATION

This is to certify that Mr. —— of —— in the colony of Victoria, is a "Registered Veterinary Surgeon" of Victoria, under the above Act.

Dated at Melbourne this —— day of —— 18—.

President
Member
Member

(SEAL)

Registrar

SCHEDULE III

Fees payable under Veterinary Surgeons Act 1890

1.	On registration without examination	£10	10	0
2.	For each examination for which a candidate may enter.....	3	3	0
3.	For registration after examination..	1	1	0

SCHEDULE IV

VOTING PAPER

Candidates' names arranged in alphabetical order—

A.
B.
C.
D.
E.
F.
G.

Signature of voter—

Registered Veterinary Surgeon.

Direction

The voter is to strike out the name of the candidate or candidates for whom he does not intend to vote by drawing a line through the same with a pen. He must be careful not to leave uncancelled the names of more than (number of vacancies) candidates otherwise the voting paper will be invalid.

He must insert this voting paper in the printed envelope, fasten it, and post it to the address of the returning officer on or before the —— day of ——, 18—.

SCHEDULE V

Declaration to be signed by applicant for registration other than a member of the Royal College of Veterinary Surgeons of Great Britain, or of any college or school recognized by the board before registration as a registered veterinary surgeon of Victoria.

In the matter of the *Veterinary Surgeons Act* 1890 —— and ——.

In the matter of the application for registration of —— of —— for registration under the above Act.

I, ——, residing at ——, do solemnly and sincerely declare that I have attained the age of twenty-one years, and that I have been continuously practising in Victoria as a veterinary surgeon throughout the seven years immediately preceding the commencement of *The Veterinary Surgeons Act* 1887, and that such practice consisted of operations upon and medicinally treating horses and other domesticated animals at the places and during the periods undermentioned.

And I make this declaration conscientiously believing the same to be true, and by virtue of the provisions of an Act of the Parliament of Victoria rendering persons making a false declaration punishable for wilful and corrupt perjury.

Declared at —— in the colony of Victoria this —— day of ——, One thousand eight hundred and ninety-

Before me

SCHEDULE VI

Declaration to be signed by a justice of the peace, legally qualified medical practitioner, or clergyman, respecting an applicant other than a member of the Royal College of Veterinary Surgeons of Great Britain, or of any college or school recognized by the board before registration as a registered veterinary surgeon of Victoria.

In the matter of the *Veterinary Surgeons Ac* 1890 —— and ——

In the matter of the application for registration of —— of —— for registration under the above Act.

I, ——, residing at ——, in the county of ——, Victoria, do solemnly and sincerely declare that I am a justice of the peace for this —— bailiwick, in the colony of Victoria, legally qualified medical practitioner, or clergyman, and that to my knowledge —— residing at —— in the county of —— was practising as a veterinary surgeon during the period or periods stated in his declaration, dated the ——, 18—, and set out therein, and that I know from my own knowledge that the statements in such declaration are true and correct in every particular.

And I make this declaration conscientiously believing the same to be true, and by virtue of the provisions of an Act of Parliament of Victoria rendering persons making a false declaration punishable for wilful and corrupt perjury.

Declared at —— in the colony of Victoria this —— day of ——, One thousand eight hundred and ninety-

Before me

—

Confirmed by the Governor in Council
the 21st December, 1897.
THOS. BRISBANE,
Acting Clerk of the Executive Council.

———

We then became better friends and had a long conversation regarding the Chief's Department. The chief does not believe in putting graduates in the slaughter houses, as it is beneath their dignity; they are professional men and not meat inspectors. Laymen are specially educated for the meat inspection and obtain their positions through the Civil Service, therefore, the graduate veterinarian in Australia is not a meat inspector, but a gentleman upholding the dignity of his profession.

Aside from a few non-graduates (the old guard) who were blanketed in, all the veterinarians in Victoria are graduates, most of them graduating from the Veternary Department of the University of Melbourne.

The college was started years ago by Mr. W. T. Kendall, M. R. C. V. S., who struggled along for years with semi-success giving the degree of Graduate Melbourne Veterinary School. It was his whole aim to get it recognized by the Royal College of Great Britain. This recognition was refused, so he had the college taken over by the Government and made part of the University. Doctor Kendall is still the dean of the college. The Government reconstructed the buildings, which had just been completed on my arrival, and I was shown around. The buildings, while small, are good, but they cannot begin to compare with any of the buildings of veterinary colleges that I have seen in the United States. The course is of five years, and about nine months to the term conferring the degree of Member Melbourne College Veterinary Surgeons. On writing a thesis and reexamination in future years the degree of doctor is conferred.

During my visit there were fifteen students in all and about five professors. Dentistry was entirely neglected, and I considered the college out of date.

It is not necessary for the graduates of this college or the M. R. C. V. S.'s to take the State-Board examination, and I believe the true reason for cutting out the American veterinarian to be a purely selfish one. I might state that the Royal College of Great Britain still refuses to recognize the graduates of the University of Melbourne Veterinary Department. I visited all the leading veterinarians in Melbourne and found them all to be fairly prosperous. Only one firm had any kind of a hospital that I noticed and no operating table; even the college was without this very necessary appliance, but one had been ordered.

A few towns in the country were visited where I found several veterinarians, but the locations were not crowded and there is plenty of room for more men, as the State law gives protection.

Sydney, the capital of New South Wales, was next visited. This State has no veterinary law, and the same condition exists as in the other States except Victoria. The most important veterinarian of Sydney is a non-graduate, he does most of the work. He has a very fine hospital for horses and another one in a different part of town for dogs. His residence, office library, and instruments are all that could be desired, but no operating table or ambulance. His father was an M. R. C. V. S., as was also his brother, and he learned the theory from

them and applies it so practically that he is considered the best veterinarian in Sydney. He also gave a certain firm in United States a testimonial for antiperiostin which is used in the *American Veterinary Review*. However, he is a very successful man and deserves all he gets.

There is also a college in Sydney which is a part of the University of Sydney. The new buildings were not completed when I was there, but it was expected that the college would be in readiness for the following term. It will be much the same as the Melbourne College.

A state law was being considered by the legislature last year and by now I suppose it is a reality.

I met the Chief of the Veterinary Corps whom I found to be a man of the old school and not very up to date and not very talkative. He had five assistants who claimed to be "run off their legs" with work. They were very fine fellows and showed me a pretty good time. Their office building is a disgrace to any Government. It consists of an old dwelling house in a terrace, quite a contrast to the beautiful office buildings for government veterinarians in the other States.

Queensland was next visited, which is the state that produces the frozen meat for England, and the United States Army and Navy in the Philippines and the Orient. Brisbane, the capital, is a small town with a great future. As the ship did not stay very long it was impossible for me to see anything veterinary there. There is no veterinary law in Queensland.

Rockhampton was next visited to take on 300 tons of frozen beef, and I got a chance to look over the slaughter houses and cattle. The cattle were of the same stamp as those mentioned in West Australia—fine, big, fat steers, which are much larger than the ones seen at the Chicago packing houses. The slaughter houses, while not as up to date as in Chicago, were very efficient, clean and sanitary, and the inspection very thorough.

Townsville was next visited, where 250 tons of beef and 500 carcasses of mutton were loaded. The ship had the United States Army contract to supply fresh beef for the soldiers in the Philippines. Townsville ranked a government veterinarian, that is, he had headquarters there, and reached out in the surrounding country, and through him I was enabled to visit the slaughter houses, which were similar to those at Rockhampton.

Thirty horses were also loaded on at Townsville for the Manila market. I pronounced them a bunch of skates; only two out of the whole lot looked like anything. They cost the owners, laid down in Manila, about ninety dollars per head. The main cost being transportation, feed and duty.

After leaving Townsville we headed for Manila via Thursday Island and Zamboanga and I arrived in Manila after a nine-months' trip, very glad to get back among Americans and resumed my old position with station at Fort William McKinley, six miles from Manila.

Recapitulation.—Among Australian veterinarians, dentistry is done with the aid of the speculum by all; they seem to be afraid to put their hands in a horse's mouth without its aid. It is also used when giving a ball, but balls and capsules are very seldom administered. They rely mostly on the drenching bottle and electuaries. The hypodermic syringe is now just getting popular, it is used chiefly in giving Arecoline in colic. I demonstrated the art of dentistry and balling to an English M. R. C. V. S., on his own horse, and he pronounced it simply marvelous.

The crooked race horse man is well supplied with hypodermic syringes and pocket cases of hypodermic tablets of American make. He doesn't know how to give it or what to give, but just shoots something into the horse and trusts to luck. If the horse wins the dope is good, if he loses, it's no good.

Shoeing is well done. They have not yet begun to use the ready-made factory shoe. All shoes are made right in the shop.

All the veterinarians are complaining about the autos cutting into their business, and it is too true. The large cities are filled with motor cars and trucks, even the old reliable cabby is fast disappearing from the streets.

Horse raising is yet in its infancy. I saw some very fine specimens of horse flesh,

especially heavy drafts, i. e., Clydes, and Shires, the Percheron not being in evidence. Thoroughbreds for the racing game are mostly raised in the eastern states and I must say some beauties are born in Australia but invariably from imported sires. The drivers or roadsters seem to be of no characteristic breed whatever, although many of them are fine animals. On the large ranches where hundreds of horses are raised, they are an unorganized mob. Mares of every size, shape and conformation are bred to broken-down racing studs.

The British army has first choice of the progeny, the German army second, and what are left are sold at home and exported to the Orient. The United States army bought about 600 head of animals rejected by the British and German armies for Philippine service, the average price paid being about ninety dollars per head, and from observation I fail to see where they can compare at all favorably with our own American horses, in any respect whatever. The Army bought these horses in 1908 and although we are short of good horses, we have bought no more from Australia.

Some Common, Equine, Non-Contagious Diseases*

By E. KELLETT, M. R. C. V. S.

Respiratory Diseases

The diseases of this class commonly seen by the general practitioner are: Laryngitis, bronchitis, pleurisy and pneumonia, with various complications.

Laryngitis

Inflammatory conditions of the mucous membrane of the larynx may be acute or chronic, and generally involve the surrounding organs and tissues from extension of the inflammatory action. The form usually met with is acute catarrh, ordinarily known as "sore throat," and caused by external influences such as exposure to cold. Occasionally one meets with laryngitis due to traumatic or chemical agencies. It also occurs as a secondary lesion to various specific diseases.

Symptoms.—The chief sign is a cough, which is dry and painful, and which later on becomes moist, with a discharge of sputum. There is local edematous swelling, and pain on pressure, which produces a paroxysm of coughing. If there is much thickening of the membranes the breathing is difficult through the lessening of the lumen. The head is held stretched out. There is a great difficulty in swallowing fluids, and also a degree of fever.

Treatment.—Place the animal in a warm well-ventilated, loose box. Apply hot compresses to the throat. Inhalation of steam affords relief. Spraying the throat with antiseptic solutions (Chinosol) is good practice, and also with adrenalin solution. Medicants should be given in the form of electuary. If the breathing is very labored tracheotomy may be advisable. Owing to the custom which is prevalent in this country of administering medicines through the nostrils, laryngitis and concomitant diseases are frequent.

Bronchitis

Involving the larger tubes is generally due to extension from the trachea, and likewise capillary bronchitis is due to gravitation of the inflammatory products. Wherever its seat the cause of bronchitis is cold or sudden atmospheric change, as in laryngitis and pneumonia, and it is more often than not associated with pneumonia. The catarrhal exudate resultant from the inflammatory action forms itself into plugs, the result being collapse of the portion of lung involved (atalectasis). Other causes, such as inhalation of irritant gases and the

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accidental entrance of foreign matter, whether medicines or foods, are frequently operative in bronchitis. Ship catarrh may be cited as an instance through vomition products gaining access to the trachea.

Symptoms.—At first a cough which is dry, quickly changing to a moist one as the symptoms develop. The cough is loud and paroxysmal, with a discharge of mucopurulent matter from the nostrils. There is fever, with respirations and pulse quickened. Bronchitis of the larger tube is not ordinarily a fatal disease, but when the smaller bronchi become involved it is without doubt the most fatal chest disease, as by inspiration the broncheoles and alveoli become impacted with purulent matter which quickly becomes gangrenous.

Treatment.—Place the animal under proper hygienic surroundings, give inhalations of medicated steam, hot compresses to the sides, belladonna and Glyco-heroin electuary, with stimulants and expectorants. Should the case hang fire a stimulant to the sides might be indicated.

Pneumonia

Owing to the structure of the lungs and the functions they have to perform, there is no organ in the body to subject to inflammation, nor is there an organ subject to such a variety of inflammatory action. Pneumonia is usually classified according to its seat, variety, and extent, such as croupous, fibrinous, catarrhal, suppurative, necrotic; or according to its seat, as lobar, lobular, interstitial; and there is also the distinction between broncho- and pleuro-pneumonia. Over and above these it is well to mention here pneumonia due to specific causes. I will confine my remarks to ordinary or sporadic pneumonia, which as a rule is due to sudden chills, exposure to cold and wet, and housing in very cold draughty stables.

Symptoms.—The disease is ushered in by shivering fits and a severe attack of fever. The pulse fluctuates according to the severity of the attack. The mucous membranes are very red, and the animal is dull, with a diminished appetite. The breathing is quickened and impeded, and the nostrils are dilated. Auscultation plays an important part in locating the exact spot, and also the area of lung involved. At the outset a crackling noise is heard, followed by a moist rattle, which is in turn succeeded by a loss of sound (consolidation) if resolution does not now take place. If the pleura is involved friction sounds are heard. It is usual in an ordinary case which recovers to get resolution after about the sixth day, but sometimes there is a delay at the beginning of the hepatization stage—probably owing to the amount of effete material getting into the circulation, which considerably delays recovery.

Treatment.—Good surroundings, dietetic care, a plentiful supply of good, pure water. The application of hot compresses to the sides. Febrifuges and stimulants are indicated. Anitfebrine in one-half-ounce doses I find as good as anything for reducing the fever. If the heart's action is weak digitalis or any other cardiac stimulant should be given. If the appetite is poor, milk can be allowed in considerable quantity. I have already made reference to the abominable practice of administering medicine by the nostrils; many lung cases are due to this cause. They are almost always all of them fatal, and especially if oil is an ingredient.

Pleurisy

Like other chest diseases, pleurisy is due to climatic influence. More often than not it is associated with pneumonia. As a primary complaint it can be associated with a rheumatic diathesis and results from an animal standing for a length of time exposed to a keen wind. Traumatic pleurisy is the result of injury to the chest wall, and associated with fractured ribs.

Symptoms.—Rigors, with a staring coat and coldness of the surface of the body are noticeable at the outset. There is a rise of temperature up to 106° F. in some cases. The breathing is difficult with the ribs fixed, the respiration being abdominal. The animal emits a grunt at each expiration, and shows signs of pain, which is sometimes mistaken for colic, as he paws and perhaps lies down. The cough is dry and painful, and if pressure is applied between the ribs a degree of pain is evinced.

Auscultation reveals friction sounds which disappear as fluid is secreted. A line of demarcation (the water line) is well de-

fined if there is much fluid in the chest, and a splashing sound, that of dropping fluid can be heard. In hydrothorax there is no pain manifested, and as a rule the temperature drops. The breathing is difficult, from mechanical interference with the action of the lungs, and death not infrequently takes place from compression of the heart.

Treatment.—If the pleuritis is unilateral with only a moderate secretion of fluid, and if the pleural area is not extensive, resolution and absorption take place in a few days. But the average case runs a more or less protracted course; one day apparently better, another worse. These protracted cases have often a medicolegal significance, as lymph is formed which causes adhesion between the costal and pleural lung surfaces.

Febrifuges and absorbents, with the application of hot compresses to the sides, and also stimulants are indicated. Cases which hang fire are benefitted by the application of counter irritants. Tapping the chest should not be delayed if there is much fluid present. The puncture should be made an inch or two below the water line, care being taken not to injure the lung tissue. It is good practice to use an aspirator, as the canula is apt to get clogged by portions of lymph.

Abdominal Diseases

These we may include under the general terms of colic, spasmodic and flatulent, and enteritis; their treatment constitutes a large portion of most general practices.

Colics

The term colic implies a condition of the stomach or bowels manifested by pain. For ordinary purposes colic may be divided into spasmodic and flatulent. The cause may in most cases be attributed to dietetic error—over-feeding or feeding on damaged forage. Concretions and calculi, and the accumulation of sand, etc., in the stomach or bowels are also frequent causes of colic.

Symptoms: Spasmodic.—The most prominent is the manifestation of pain, which comes on suddenly and often when the animal is in harness or under the saddle. He starts pawing and looking round at the flanks and attempts to lie down. If unharnessed he quickly assumes the recumbent position and rolls over two or three times, emitting groans. He gets up and gives himself a shake and the symptoms may disappear for a time, soon, however, returning. If he is not now relieved the exacerbations of pain become more frequent, and sweats break out over the body. The animal throws himself down more recklessly. The pulse becomes frequent, and the membranes injected. Animals assume peculiar positions during the progress of the disease, sometimes kneeling and at other times sitting up on the haunches. The latter position was considered by some practitoners to be indicative of ruptured diaphragm, and lying on the back with the legs in the air, as pointing to twist, but I have frequently seen these positions assumed by animals which have recovered.

In venturing a prognosis one should be guarded, because cases which at the start only show modified symptoms sometimes terminate fatally, due to complications such as twist or rupture. In an ordinary case, with abatement of the pain, a general improvement of the other conditions, and a return of peristaltic sounds, one can assume that the animal has recovered. If there is a continuance of the pain for over five or six hours one may anticipate complication—twist or rupture—and the pulse would be an indication whether or not enteritis was likely to ensue.

In rupture or twist the pain is excessive. In ruptures, especially of the stomach, vomition was regarded as a definite symptom, but as vomition is a mechanical act and brought about by pressure of the abdominal muscles on the stomach, I fail to see how vomition can take place if the stomach is ruptured. There is more likelihood of the contents escaping through the tear into the peritoneum. I am of opinion that where vomition has occurred, and on post-mortem ruptured stomach has been demonstrated, vomition preceded the rupture, and that the rupture was probably due to the pressure of the muscles on an engorged stomach.

In proof of the fallacy of the vomition theory I have frequently seen cases recover where vomition was a prominent symptom. In cases of acute pain with a tendency to

press the hind quarters against any obstacle that might be in the way, it is reasonable to assume that the lesions are in the colon, and due to impaction.

Flatulent Colic

Flatulent colic is, as a rule, due to faulty digestion, or to food that easily undergoes fermentation. In this country [South Africa] the majority of cases are attributable to feeding on mealies. Ruptured stomach is by no means uncommon as the result of watering animals after a feed of mealies. Allowing the necessary amount of moisture, mealies easily undergo fermentation, with formation of the requisite amount of gases to constitute tympanites. In this form of colic the pain is not nearly so acute as in the spasmodic, but it is more continuous. The abdomen is distended, and resonant on percussion. The pulse soon becomes rapid and feeble, and the extremities cold. There is an anxious expression, and if the animal lies down he does so with much care. If relief is not speedily given the pressure brought to bear on the lungs causes asphyxia, and the animal becomes comatose from absorption of the poisonous gases.

Tympanites may arise from obstruction caused by concretions and calculi, and may also occur as a secondary lesion in other diseases.

Treatment.—Spasmodic colic being due to some irritant in the alimentary canal, the most rational treatment is to unload the bowels by a purgative, followed up be enemas of warm water. The pain can be controlled by sedatives, and I have found nothing superior to chloral, as in addition to relieving the pain its aids the action of a purgative.

Arecoline in one grain doses acts quickly and is efficacious. This drug stimulates the secretory glands and causes an excess of fluid to be poured into the intestines. In all cases it is advisable to examine the condition of the bladder, and if full the contents should be drawn off with the catheter. It is often noticed that relief is afforded by free urination.

The application of irritants to the abdomen is to be condemned. I am of opinion that they add considerably to the animal's sufferings, and tend to lower the vital powers. Morphine and atropine, given subcutaneously, invariably afford relief.

If the symptoms are urgent no time should be wasted; the trocar should be used at once. If fermentation continues, a little dilute carbolic acid injected through the canula arrests it. I usually inject a grain of arecoline, and if there is pain after relieving the pressure of gas, chloral with ammonia may be given.

If there is much tympanites it is dangerous to administer medicines by the mouth. The fact of elevating the head intensifies the pressure on the diaphragm, and suffocation is the natural consequence. Most of the complications arising from colic are brought about, in my opinion, by animals throwing themselves about and rolling; volvulus, twist, invagination, and rupture are commonly found on postmortem examination.

I don't know of any diagnostic symptoms which is characteristic of any of the foregoing complications. In ruptured diaphragm there is a great deal of dyspnea, and I am inclined to think that death is mainly due to asphyxia. From observations taken at the South African railway stables where they have an average stud of between 800 and 900 animals, I found that out of twenty-two autopsies on bowel cases extending over a period of nine years, eleven were ruptured diaphragm, three were twist, and two ruptured stomach. Naturally, with a stud of these dimensions, colic cases are frequent, notwithstanding the fact that the stable management leaves nothing to be desired.

Enteritis

Enteritis as a sequel to colic is not by any means of rare occurrence, but it may be primarily due to over fatigue, cold from exposure, washing an animal with cold water when heated; the excessive action of purgatives. Eating raw potatoes and wheat have been known to produce enteritis. In such instances it is associated with gastritis.

Symptoms.—Continuous pain, cold sweats about body, cold extremities, absence of abdominal sounds, membranes very injected, breathing quickened, mouth dry and hot, abdomen tender on pressure, pulse

small and wiry. When about to lie down the animal does so with more care than in colic. The expression is haggard in the extreme, and to my mind, diagnostic. There is an inclination to walk around the box, and now and again the animal stands in a corner for a while, pawing the ground with each foot alternately. Later on he sways in movement, balancing the body with legs which are as stiff as props. Tremors are now noticeable, and death very soon closes the scene. Sometimes there is a cessation of the symptoms before death, indicating that gangrene of the inflamed part has set in.

Treatment.—As enteritis is almost invariably fatal, the aim of the practitioner can be only palliative. Treatment, in my opinion, is at best empirical, but where clients are concerned an attempt must be made to alleviate symptoms. Opium used to be the sheet anchor, and it was no unusual sight to see an animal suffering from enteritis exhibit symptoms of opium poisoning. The same results could be more quickly brought about by the administration of large doses of morphine and atropine, and with much less suffering to the animal. Chloral might be given by the mouth to intensify the action. The only hope of a possible successful issue is to keep the case absolutely quiet. The application of hot compresses to the abdomen may afford relief.

General Diseases

Diseases of the liver and kidneys as primary complaints are rare in horses, but may occur as secondary lesions in other diseases. As a rule derangement of the liver can be traced to faulty feeding, or is manifest in animals which are gross in constitution. Mechanical obstruction in the bile-ducts, causing a reabsorption of the bile products into the circulation, gives rise to a condition which might be termed jaundice.

Symptoms.—A degree of fever, dirty tongue, urine tinged yellow, likewise the feces; constipation, sometimes colicky pains; grinding of the teeth, and a tendency to eat dirt and lick the walls.

Treatment.—Restricted diet, cathartics followed by salines. Liver stimulants should be used with caution, because, as a rule, the secretory powers of the liver are unimpaired.

Nephritides

The kidneys of the horse are, in a great measure, exempt from disease, and the only lesions one comes across are those traceable to the irritating effects of diuretics like turpentine, or to the result of absorption of cantharidine from blistering too large a surface.

Symptoms.—In the congestive stage there is fever with colicky pains. Frequent attempts to micturate with only a small quantity of urine passed at a time, increased thirst, with constipation.

In nephritis there is a total suppression with frequent attempts to urinate but if the bladder is explored it is found to be empty. In one case which I remember there was an exudation through the pores of the skin, which smelled very strongly of urine. Symptoms of uremia were also present.

Treatment.—A dose of physic, followed by demulcents. Hot fomentations and compresses to the loins. If due to blistering wash the blistered surface. Enemas afford relief.

Biliary Fever

An intra-corpuscular disease, due to the presence of piroplasma equi. It takes its name from the fact that the mucous membranes are pigmented with bile. The disease is prevalent during the summer months, although cases may be met with all the year around.

Animals out at grass are more subject to inoculation than those that are stable fed, but it is not at all uncommon in stabled animals owing to the carriers of the disease gaining access by means of the bedding. Country breeds are less liable than imported animals, and one attack is supposed to render immunity.

Symptoms.—Extreme lassitude, capricious appetite, elevated temperature up to 105° or 106° F., anemia and polyurea. The mucous membranes quickly assume a yellow tint. There is much thirst, and the animal quickly loses flesh. In bad cases petechial spots appear on the membranes of the eyelids. These spots invariably indicate the severity of the disease. It fre-

quently happens in practice that one is called in when the case has assumed serious proportions, the animal having been worked up to the last, and is, in fact, in a dying condition.

Treatment.—Place the animal under good hygienic conditions, and blanket if the weather is cold. The subcutaneous injection of arrenhal in ten-grain doses is good treatment. If stimulants are indicated they may be given. I have found ammonia to answer. In a few bad cases I have known trypanblue in 200 Cc. doses to act like a charm. Febrifuges may be given in the drinking water, which should be changed several times daily. Bran and crushed oats, with plenty of green forage, should be given as food.

Stomach Staggers

A morbid condition of the brain caused by reflex action from the stomach, and due to some irritation which is conveyed through the sympathetic nervous system. Some animals seem to be predisposed to this disease. Hot weather, and stuffy, ill-ventilated stables are factors which assist in producing this condition, and engorgement with indigestible matter undoubtedly contributes towards rendering animals liable to the malady.

Symptoms.—There is a disturbance of volition, consciousness, and perception. The animal stands with his head pressed against any object in his way, and involuntarily moves his legs as if walking on. The eyelids are half closed, and the lips hang pendulous. The eyes are more or less amaurotic. No notice is taken of anything the animal being quite oblivious of its surroundings. Mastication is performed slowly and it is quite a common occurrence to see an animal stop chewing and drop out the mouthful. Drinking is performed by plunging the head deeply into the water, and it is not unusual to see an animal with his forefeet in the manger and attempting to climb into the rack. These conditions are alternated with periods of excitement, the horse throwing himself about and becoming violent. During these attacks profuse sweats bedew the body.

Treatment must be depletory. The abstraction of seven or eight quarts of blood from the jugular drains the congestion. Administer a full dose of physic and keep the animal short of food. Ice may be applied to the head. During convalescence give iodid of potassium.

There is a condition sometimes met with during very hot weather which, as a rule, affects animals while in harness. This condition may be termed *Vertigo*. The animal stops suddenly, shakes its head, trembles, and falls down in an unconscious condition. For this pour cold water over the head and neck, rest animal in a cool stable, light diet, with salines for a few days.

Tetanus

Tetanus is by no means an uncommon disease in the neighborhood of Johannesburg. It is a toxic infective disease, due to the bacillus of tetanus, which gains access to the system through a wound or abrasion in the skin or mucous membrane. The bacilli are always present in garden mould and in horse dung, and for this reason it is unaccountable that this disease is more prevalent in some districts than in others. Surely there is something else in operation of which we have no cognizance. Some authorities affirm that the bacilli of tetanus are always present in the alimentary canal of healthy animals.

Symptoms.—These are unmistakable and characteristic. There is a noticeable stiffness in movement, first in the limbs, which gradually extends to all the muscles of the body. The breathing becomes accelerated, the neck elongated, the nose protruded, and the nostrils dilated. The tail is elevated and if the head is the least bit jerked up the eyeballs revolve in the sockets, showing the white of the eye. The jaws now become more or less locked, and the more complete the trismus the more difficult for the animal to obtain food or water. All four legs are stiff, the animal moving about as if it were jointless, and with a peculiar straddling gait. There is profuse sweating, the functions of the body being more or less in abeyance.

Treatment.—It is of the greatest importance to place the animal in suitable surroundings. A darkened, well-ventilated loose box, bedded down in sawdust so as not to impede the movements. On no account

must medicines be forced into the animal. If there is a little movement in the jaws an electuary of chloral and belladonna may be smeared on the teeth, as I think it modifies the spasm of the muscles.

The subcutaneous injection of tetanus antitoxin has proved efficacious in some of my cases. Two injections of 3000 units should be given during the first twelve hours, and one dose daily for the next four or five days. The only drawback to this treatment is the expense. Food of the most assimilable nature should be given, sloppy bran, steamed oats, thin gruel, and green forage chopped fine, allow a plentiful supply of fresh water.

Slings, in my opinion, do harm, as the restraint causes excitement, which is detrimental to a successful termination. If a case goes on favorably there is a modification in the symptoms about the fourteenth day, when the muscular spasms should be less rigid, and about the twenty-first day the animal is convalescent. At least three weeks should be allowed for recuperation before returning the animal to work.

In one case I tried the subcutaneous injection of brain emulsion, the object being, according to Fiebiger, to effect a combination with the toxins, the supposition being that the toxins have a great affinity for brain matter. As the symptoms were fully developed in a few hours it hardly gave the treatment a chance; the animal died during the night.

I am convinced that in a case where the symptoms are fully developed in a short space of time there is no chance for a recovery, and that the animal should be destroyed.

Out of eight cases which I have attended in one establishment three animals recovered.

Azoturia

A blood disease, due to the presence of effete products in the circulation, brought about by excessive metabolism of the tissues. The blood is in a hypernitrogenous condition, and exercise only is required to induce a rapid oxygenation whereby certain constituents are converted into urea. It is closely allied to hysteria, and in my experience much oftener seen in mares during the period of estrum. It is more common among racing stock than in any other class of animals, and the majority of cases which have come under my notice have been of a subacute nature.

Symptoms.—These appear suddenly after a varying amount of exercise. It invariably happens the animal has been rested for a few days previously. The animal sweats, and experiences a difficulty in bringing the hind legs forward. There is a disposition to lie down, and when down a violent struggling to regain the feet. The muscles of the quarters and loins, especially the glueteals, stand out prominently, and are hard to the touch.

Treatment.—In mild cases a dose of physic should suffice, with light diet. If the animal is down and unable to rise it should be placed in slings. I have had good results from the subcutaneous injection of four or five drams of a 1 to 10,000 solution of adrenalin.

Laminitis

Inflammation of the sensitive laminae is a very painful disease and gives rise to much constitutional disturbance. Owing to the amount of fast work it has to do the horse is much more liable to laminitis than the mule. I have only seen two cases in mules, both of which were due to metastasis from irritation of the bowels. Two forms are met with, the acute and the chronic. The chronic form with structural change is the outcome of the acute, and generally results from more than one attack. I must say that in my experience the average case seldom goes beyond the congestive stage, and that resolution takes place in a few days.

Laminitis arises from direct concussion, and rapid and long continued exertion on hard roads. Standing in a constrained position, as on board ship or on a long railway journey, is also a fruitful cause. Irritation of the bowels where there is much purging is sometimes, by metastasis, accountable for laminitis. Bad shoeing, where the sole has been weakened, is a predisposing cause, and animals with fine bones and big gross bodies are, from slight causes, predisposed to the disease.

Symptoms.—The animal evinces uneasiness, and shifts the weight off one foot

on to the other. He breathes quickly and sweats. The pulse is quick and full. There is a tendency to hang back, throwing the weight on the heels. He makes frequent attempts to lie down, but seems to be afraid to do so. Or he may stand with his fore feet out, with disinclination to move. The feet are hot to the touch. As a rule both fore feet are affected. If all feet are involved, the animal stands with his hind feet well under the body and the fore feet advanced. If only the hind feet are affected, he stands with the fore feet well under the body—in fact all of a heap. This form of laminitis is rarely met with. Sometimes it happens that only one foot is affected, and results from some injury to the opposite leg, where the animal has thrown all of its weight on the leg which was originally sound.

Treatment.—A roomy, well bedded box is essential. Remove the shoes, put the feet in warm poultices. Cast the animal if necessary. When once down he seldom attempts to get up. I have found the subcutaneous injection of arecoline in one-grain doses, repeated once daily for three or four days, good treatment; it seldom fails to effect a cure. Feed on light restricted diet.

Remarks on Ophthalmia, with Special Reference to Certain Traumatic and Idiopathic Disturbances*

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IN general veterinary practice affections or injuries of the ocular structure are frequently encountered, and unless possibly the teachings of recent years are to be excepted, we have to confess that attention to disorders of the eye and its adnexa has been altogether too perfunctory. Once these structures have become diseased, we have accepted certain results, usually deleterious to the well-being of the animal as a foregone conclusion, and by this lethargy curtailed progress.

In presenting this topic for your consideration, the writer makes no claim for new or miraculous discoveries in the way of diagnosis or specific therapeutics, but selects his subject imbued with the hope that it may stimulate investigation into this all-important, but thus far unappreciated field of professional research. In the selection of a title the word "Ophthalmia" has been chosen not because primary mild inflammatory processes are considered of lesser importance than severe inflammatory dusturbance, but simply because it seems to best serve the purpose of including all varieties of inflammatory disturbance of the ocular structures irrespective of cause.

The formation of the eye and associated parts is so complex and delicate, also the varied character of disturbances so numerous, that to have a clear understanding of the pathology of eye affections a knowledge of the anatomy and physiology of these parts would appear to be imperative; it seems, therefore, not out of place to review somewhat the structure and esthesiophysiology of the organs under consideration, even though time forbids of intricate detail.

The organs of vision comprise both directly and indirectly relative structures. The eyeball proper has the form of a flattened spheroid, with a somewhat greater vertical axis, so situated within the orbital fossa as to be more or less protected by the bony wall and imbedding fatty tissue; it has three distinct coats: the sclera, vascular, and nervous tunics. The outermost, or sclerotic tunic, often termed the "white of the eye," envelops practically four-fifths of the eye-ball; it is made up of dense, white, fibrous tissue that is interspersed with a few, fine elastic fibers. On the outer surface of the sclera are attached the tendons of muscles which support the eyeball and aid in changing its

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axis; the sclera is far more vascular anteriorly, where it blends with the subconjunctival tissue, and likewise the oval cornea or remaining one-fifth of this sclerotic or fibrous tunic.

The cornea, a transparent, non-vascular structure, circular in most eyes, but oval in the horse, allows light rays to penetrate the eyeball and is the chief refractive apparatus, being even more important in this respect than the crystalline lens, as its focal length expands to over twice the area of the latter; moreover, upon removal of the lens, an operation at times performed for relief of blindness due to cataract, the dioptric effects are not destroyed, while corneal injury on the contrary severely impairs these refractive powers. It is composed of five layers of tissue: central or *substantia propria* which constitutes the main portion is directly continuous with the fibrous connective tissue of the sclera. The blood supply to the normal cornea is limited to the circumferential area, but its whole substance is freely supplied with nerve tissue, and nutrition is derived through circulation of lymph.

Intimately related to the inside of the sclerotic tunic is the brown colored, non-sensitive, choroid coat, or vascular tunic, which serves to separate the white fibrous sclera from the delicate nerve tunic or retina. This middle coat extends anteriorly from the entrance of the optic nerve to the margin of the pupil, and is made up of three distinct portions; that is, beginning posteriorly, choroid proper, ciliary body, and iris. The first and second contact with the sclera and extend from the optic nerve to the anterior limit of the retina, while the iris bends inward, floating free within the cavity that develops anterior to the lens and which is unequally divided into an anterior and posterior chamber.

The iris, or third portion of the middle or vascular tunic, may be described as an adjustable, muscular diaphragm, supplied with a series of blood vessels, making it exceedingly vascular. It is punctured centrally by the pupillary opening, which varies somewhat in shape among different animals; though circular in the dog, it is normally elliptical in the horse, but becomes circular during dilatation through a lateral pull exerted by the ligament inhibitor attached to the sides and rear of the iris. The cow, sheep, and cat likewise have elliptical openings; in the latter, however, the elliptical slit is vertical.

Movement of the iris is regulated through a sphincter and a dilator muscle that are supplied both with sympathetic and motor nerves. While the iris is rather sluggish in most animals other than felines, it is well to have in mind that in the horse it relaxes under artificial light, thus rendering the use of the ophthalmoscope especially valuable for examining the interior of the equine eye, and obviating the necessity of atropine for its mydriatic effects; again, that exercise or sudden death produces a similar dilatation to the pupil. The color of the iris varies, depending upon the amount of pigment deposited within the cells of its inner portion.

The light rays penetrate through the pupillary opening to be impressed upon the retina beyond; the iris reflexly narrows as light increases in intensity, thus cutting the rays at the periphery and obviating the tendency for marginal errors in focus during the time the center of the image is on the retina. At the time of contraction of the *sphincter pupillae* to produce greater extension of vision when gaze is fixed upon a nearby object, there is also contraction of the ciliary muscles, thus improving ocular accommodation through shortening of the eyeball; this is brought about by pulling forward the choroid coat, which in turn lessens tension on the suspensory ligaments attached laterally to the lens, whereupon the latter through its natural elasticity bulges, thus increasing its refractive power. In the horse there is normally found on the upper center of the edge of the iris, sometines on the lower edge, one or more bodies called *corpora nigra* of uncertain function, but giving the edge a ragged aspect.

The third or nervous tunic of the eyeball may be described as the inner circumferential, concave wall or perceptive membrane upon which light impressions are received. It is developed, together with the brain, during embryonic life and extends from the entrance of the optic nerve to the circumference of the pupil, but does not all

functionate as a light receptor, for it becomes atrophic over the ciliary body and iris of the vascular or middle tunic; the functioning portion of this delicate membrane being intimately applied to the choroid part of the middle tunic. The retina is made up of an outgrowth of the brain sac, composed of nerve elements distributed as an outer and inner surface; the outer surface, or pigment layer, where the visual purple is produced, later to be decomposed by light, represents the outer wall of the fetal optic vesicle. The inner surface of the retina is divided into several layers and contains within its substance ganglionic cells that are continuous with the brain after consolidating into the optic nerve. The most important of these latter being the layer of rods and cones, where the visual impulses are produced as a result of light vibration and from whence these impulses are carried back to that portion of the retina adjacent to the vitreous humor, where, received by the nerve fibers, the impressions are conveyed to the brain. In the center of the retina and somewhat above the optic nerve is an unpigmented spot readily seen with the ophthalmoscope which is called the *tapetum lucidum*, giving to the eye the property of shining in the dark.

The optic nerve, after passing anteriorly from the under surface of the brain, enters the orbital fossa, projecting somewhat into the posterior circumference of the retina as the optic papilla. It is surrounded by three sheaths as prolongations of the meninges of the brain, that is: dura mater, pia mater, and the central arachnoidal sheath, the inner or pial sheath becoming continuous as the sclera. The optic papilla devoid of retinal covering gives no response to light impressions and is termed "the blind spot." Fibers entering the optic disc from the retina pass from each eye to a region at the base of the brain, there coming together in the optic chiasma; after this junction the fibers again separate and while some decussate, others pass to that side of the brain which corresponds with the eye from which they have come. In the horse about one-sixth of the fibers go to the same side, while in man only two-fifths decussate.

Lying in close proximity and immediately behind the iris is the crystalline lens, a biconvex transparent body composed of a series of concentric or onion-like laminae, which tend to centrally intensify the refractive character of this portion. The lens is enclosed within a closely adhering capsule of elastic character. This important refractive portion of the eye is without blood vessels, except during fetal life, and is held in place by a suspensory ligament that takes part in changing the shape of the lens when aided by the ciliary muscle.

The rest of the eyeball is largely hollow and in front of the lens has two unequal chambers; an anterior one bounded in front by the cornea and behind by the iris and crystalline lens; posterior chamber, the smaller of the two, lies behind the iris, but between it and the lens, being continuous with the larger chamber through the pupillary opening. These chambers contain a watery fluid termed aqueous humor, which has to do with maintaining the intra-ocular pressure and shape of the eyeball. After withdrawing the fluid from the anterior chamber the cavity refills within twenty-four hours. This liquid is a tissue lymph derived from blood plasma, but whether secreted or produced through purely mechanical filtration, opinions differ; certain it is that anything increasing blood pressure augments intra-ocular tension.

Behind the lens, which it helps to support, and anterior to the wall of the retina is a semi-fluid, transparent, refractive media termed vitreous body, or vitreous humor.

The structures indirectly associated as accessory to the visual anatomy are the eyelids, constituting an upper and lower movable palpebrae, having both voluntary and involuntary movement. Each lid has a free cartilagenous border covered externally with skin and internally with mucous membrane; the lids comprise five distinct tissues arranged from without in, as the skin, subcutaneous tissue, muscular layer, tarso-fascial tissue, and conjunctiva. Upon either lid at the inner angle of junction or inner canthus, may be noticed a small elevation or projecting puncti, the excretory openings to the canaliculus that leads from each lid to the

upper portion of the nasal duct, or as it is termed the tear sac; this sac, lodged within the lachrymal bone, collects the surplus tears prior to their escape along the nasal duct, which opens subsequently inside of the nostril wing. Each lid is supplied with a double row of cilia or "eyelashes," those of the upper being the longer and more numerous.

Second accessory—lachrymal gland, is located superiorly to the eyeball beneath the orbital arch and composed of glandular tissue with ducts that unite to form the hygrophthalmic canal, out of which pours the watery alkaline secretion anteriorly over the surface of the eye.

As a third accessory to the eye proper should be considered the all important mucous membraneous covering that becomes continuous with the sclera upon its outer anterior circumference of the eyeball and is then everted over the inner surface of the lids. This mucous membraneous lining, respectively termed "the bulbar" and "palpebral" conjunctiva, has also a third portion or semi-lunar fold, variously called "third eyelid" or *membrana nictitans*, which is only partially seen, except during strong retraction of the eyeball, when it is observes to protrude from beneath the inner canthus of the lids. Constant secretion from this mucous membrane, aided by that from the lachrymal glands, together with an involuntary motion of the lids, serve to keep the surface of the eyeball free from irritating substances and to moisten the sensitive corneal surface.

The entire eyeball is richly vascular, including the conjunctival vessels derived from the palpebral and lachrymal arteries; the ciliary arteries supplying the sclera, choroid plexus and iris, and also the vessels of the retina derived from an artery that enters the eyeball in the center of the optic nerve.

In using the eyes, the animal keeps the eyeball in more or less constant motion, to facilitate bringing each object toward the center of the field of vision, and though the entire external world may be considered as the visual field, it is limited both by configuration of the head and refraction defects. In consideration of the former the vision is either monocular, binocular, or a combination of both, and while monocular vision gives a wide visual range, binocular sight furnishes greater clearness. Eyes laterally placed, as is the case with the horse, have monocular vision, while the cat or man are examples of binocular sight.

The equine furnishes a complex example of combined monocular and binocular movements, for while looking at an object directly ahead, although binocular vision is possible, the ocular movements are opposite, thus bringing the pupillary portion of both eyes simultaneously toward the center, a double internal squint, and in no other position is this vision possible; here movement of an eye toward the nasal region of the head is associated with the same direction taken by the other eye, while in man, movement of an eye toward the nose is associated with the other eye going toward the temporal side. During monocular vision on the contrary the movements are lateral or posterior. As most animal enjoy monocular vision, there is less impairment than in man as a result of the loss of sight in one eye, and although there is a degree of impairment as regards area, depth, or solidity of objects, there continues a fair degree of accuracy.

The constant motion of the ocular ball is accomplished through the aid of seven extrinsic muscles, innervated by the third, fourth and sixth pairs of cranial nerves. The fourth and sixth supply the superior, oblique and external rectus respectively, while the third pair furnishes movement for the remaining four; that is, internal, superior and inferior recti, and the inferior oblique.

During the discourse on the structure of the eye it was intimated that the visual parts were more particularly in the nature of impression surfaces and refraction media. The former comprise two lenses and two corneal surfaces, each with different curvatures, while the refraction media include the lens substance, with varying refraction throughout, the aqueous and the vitreous humors. These surfaces and media collectively and toward placing an image of an external object or ray of light directly upon the sensitive retinal surface, but investigation will disclose the fact that these images are inverted, as is the case with a

photographic camera, and though actually inverted upon the retina, objects are appreciated in the same erect manner as they actually exist, because all visual sensations take place in the brain and by habit sight-seeing animals have learned to project the retinal sensations outward into the external world.

There are certain congenital or acquired defects in refraction, but more especially common in animals is the condition of myopia (short-sightedness), where as a result of excessive lens or corneal curvature, or again because of too much depth to the eyeball, the rays of light focus in front of the retina, thus causing blurring of the image. This is often a cause of shying.

A number of instruments have been devised that permit objective study of ocular refraction, and while from the use of charts and a series of spherical and cylindrical lenses it may be studied subjectively in its application to the human being, such methods do not pertain here. With us the ophthalmoscope furnishes valuable aid in the examination of the eye assisting in the recognization of diseased conditions of the retina, as well as helping to detect abnormalities of the refracting surfaces.

Alterations in Expression

Before discussing any special disease involving either the eye proper or its adnexa, we are tempted to stop for a moment to consider the subject of expression and alterations of one or more of the ocular structures resulting from certain influences operating both during health and under abnormal conditions. The dearth of literature in this regard would indicate that little more than passing thought has been given to the whyfore or values to be deducted from the enormous range of variation in expression, which becomes manifest with apparently the very slightest alteration or movement of the lids or ocular structure. To emphasize the significance of this to the normal animal it is only necessary to recall methods employed by the expert horseman and observe what degree of reliance is placed upon a skillful interpretation of expression when making a selection of a special type of animal. Determined primarily what type or conformation is desired, selection is made only after due consideration is given to the appearance and position of the eyes; experience has taught this trained individual that he can find there interpretations of quality and character. Besides selecting an animal with a clear, sparkling cornea and uniformity of the two eyes, the degree of mobility of the lids, of restlessness of the eye itself, of natural vigor and trustworthiness, is also noted, as is indicated through changeableness and frankness of expression.

As there is therefore much to be gained through intelligent interpretation of appearance of the normal eye, so also will an observer find this organ a valuable indicator of either local or general systematic disturbance, and this frequently through changed expression alone. As the eye becomes an indicator of vigor or feebleness, it likewise interprets severe pain by peculiar, but not readily explained, contracted movements of the palpebral muscles of the upper lid more especially. Again, we read anxiety, worry, or fear, even evidence of collapse, as is seen in the so-called "glassy" eye of the unfortunate victim of internal rupture, perhaps occasioned during the agonies of enteralgia or the dissolution of the last stages of pleurisy; once more, depressing fevers show dullness, lassitude and lack of expression, even partial rotation or retraction of the eyeball so commonly seen in the sick cat. Repeated disease involving the eye tends to diminish size, and in recurrent ophthalmia we note a characteristic triangular appearance of the upper lid, observed even between the intervals of attack. Other diseases are likewise not infrequently associated with ocular changes; tetanus, characterized by retraction of the eyeball and extension of the membrana nictitans over the cornea, as well as a nervous twitching in these parts; edema of lids, or chemotic infiltration accompanying the so-called "pink-eye" variety of influenza, epizootic cellulitis and purpura hemorrhagica. Finally in human medicine great stress is placed upon the tendency for ocular complications during certain specific fevers, as foot-and-mouth disease, influenza, pneumonia and measles, where conjunctivitis is especially liable to

intervene; likewise complications involving the eye or appendages attending typhoid fever and tuberculosis, as well as those coincident with disturbances of the urinary apparatus, where, for example, the blood poisoning of Bright's disease attacks the nervous system with special intensity oftentimes resulting in impaired vision.

So might one continue, even supplying detail, to demonstrate the very intricate relationship between mental impressions or disease and ocular alterations or expressions. Sufficient has been said, however, to strengthen a claim of sympathetic unity between this organ to a morbid state of the system and the possibilities for a great range in the variety of such alterations may be readily appreciated when one realizes that no less than six of the twelve pairs of cranial nerves send branches to the eye or its appendages and that of these the second, third, fourth and sixth pairs are distributed exclusively to these parts; moreover, this innervation is further reinforced by branches from at least two cranial sympathetic nerves.

It can be safely asserted that the nervous system is fundamentally instrumental in stimulating these interesting alterations, especially those changes in expression observed during health and which are particularly influenced through mental impressions and temperament, but this does not seem to intelligently account for changes accompanying the morbid conditions, a few of which have been cited. Intelligent answer to interrogation as to why these changes do actually supervene; why debilitating fevers produce a dull eye and appearance of listlessness; again, why pain is associated with what we have come to interpret as anxiety, and finally why collapse is accompanied with that glassy look, would furnish useful knowledge that must necessarily be accumulated slowly. This certainly opens an attractive field for research and study that should serve as a valuable reinforcement to objective methods in diagnosis, recognized as fundamentally important in the interpretation of symptomatology in veterinary medicine.

Without having had opportunity to pursue methodical investigation with a view toward elucidating the true etiologic factors pertaining in these instances (an investigation we hope to begin shortly), it may be reasonably suggested that the direct result of even slight impairment to the bodily functions tend toward alteration in the condition of the blood as regards its purifying abilities; toward change in the vessel walls through increasing or lowering arterial pressure or producing a tendency toward permeability; likewise, effecting the nutritive carrying powers of the circulation. These disturbances in turn must naturally affect the innervation, but in a manner to be governed entirely by the degree of influence exerted through the morbid factor. To illustrate: Note the predisposition toward cataract when nutrition is interfered with; the tendency for conjunctivitis to accompany influenza or pneumonia, where in the latter instance the pneumococcus organism may be isolated from the mucous membraneous discharge; likewise observe the liability for changes in the appearance of the sclera during jaundice, or, again, feebleness of accommodation accompanying general weakness.

Congenital Anomalies

Arrested development or aberration in growth of embryonic tissue furnishes some interesting instances of impaired vision; these mutilations or imperfections may involve any one, two or all portions of either the direct or indirect ocular structures and, although too numerous to permit of exhaustive consideration, some, at least, are sufficiently common to make them worthy of mention.

Coloboma.—In the normal evolution of the eye during primary development of the optic cup and its stalk, which is occasioned as a result of invagination of the optic vesicle, there is formed the choroid fissure thus allowing an ingrowth of the embryonic mesablastic layer to convey blood vessels into the interior and, likewise, to aid in the future formation of the vitreous humor. Should this invagination or groove fail to close completely, as it subsequently should to thus become obliterated, the result would be a defective eye and, depending upon the depth of the cleft, become influential in the formation of either a choroidal or iridal

fissure, or, as frequently happens, of a compound fissure involving both structures, respectively termed *coloboma choroideae* or *coloboma iridis*. Either defect is sufficient to cause an irrelievable impairment to vision and one believed to be easily transmitted by inheritance. Similar fissures are discovered at times upon other ocular structures and they are quite generally associated with cataract.

Likewise during embryonic growth a coloboma or fissure of the eyelid may result through arrested development. In appearance these fissures simulate the hare lip and are classified as *coloboma palpebrae congenitum*. The opening is somewhat triangular with apex toward orbital margin and renders complete closure impossible. It is possible to relieve this anomaly under the general rules of surgery by freshening the edges of the fissure and suturing to unite the raw cutaneous margins.

Opacities.—The lens, an epithelial structure derived from the external germinal layer, consists primarily of a hollow sac that subsequently becomes filled with cells to constitute a solid sphere; during this embryonic period blood vessels distributed throughout the eye are derived mostly from the central artery of the optic nerve which, extending anteriorly, reaches the posterior surface of the crystalline lens and from thence ramifies over this area. As the lens is similarly covered anteriorly by vascular network, it is entirely enclosed within a vascular membrane, *tunica vasculosa lentis*, which subsequently becomes the transparent lens capsule. Occasionally this tunica, which should become unobservable prior to birth, persists in the region of the pupil, producing a state of *atresia pupillae congenita* or closure of the pupil.

Blindness as a result of opacity of the crystalline lens, or what is commonly termed cataract, occurs during intra-uterine life as a result of inflammation in the fetal eye or consequant upon disturbed development.

Again, in the early development of the vitreous humor, which has origin from cells of the inner layer of the ocular vesicle, or, in other words, that portion which ultimately becomes the retina, and while it is gradually pushing the lens toward the anterior wall, there passes through this region the arteria centralis of the optic nerve on its way to the *tunica vasculosa lentis* as stated in foregoing paragraph. This artery should later become a transparent lymph structure, the *canalis hyaloideus*, but if defective may remain persistent from retina to posterior lens surface and so cause impaired vision through producing opacities on the posterior portion of the lens.

Among other opacities may be mentioned those of corneal origin that are not especially frequent but occasionally develop from fetal keratitis or on connection with other congenital anomalies of the eye.

Speckled Retina.—Inheritance appears to play an influential role as does, also, consanguinity of parentage in producing defective sight. Among conditions directly attributed to these factors is a state where the retinal pigmentation is spotted rather than diffuse, and the result of pigmentation degeneration being more rapid than the physiologic pigmentation process. This defect narrows the visual field and diminishes central acuteness of sight, and, like other anomalies of the primary structures, cannot be overcome.

Albinism.—An absence of physiologic pigment of congenital origin and very readily transmitted through inheritance. It is characterized as an eye with a light gray iris that appears reddish on transmitted light; pupil shows red and with the aid of an ophthalmoscope the retinal blood vessels are seen clearly outlined upon a white background. Examination of the retinal surface of the albino eye has demonstrated that though the pigment cells are present there is an absence of the normal coloring matter. Eyes of this character are essentially photophobic, the eyeball tends to roll with considerable constancy, vision is less acute and there is a tendency to nearsightedness.

Palpebral Fusion.—The eyelids are formed from ectodermal ridges that originate both above and below the ocular opening; these ridges subsequently develop into folds composed externally of skin and internally of mucous membrane. During the early embryonic growth of all

animals, the lids are separated but ultimately grow toward one another to become fused at a more mature period of fetal life. This fusion, shortly before birth in most animals, becomes again dissolved, thus permitting re-opening of the eyelids. Exception to this in normal instances can be observed in the blind mole, and, moreover, the time of opening varies in different species, some being anti-partum while others are post-partum. Persistent fusion as an anomaly occurs resulting in a state of blepharal closure and blindness through inability of light rays to penetrate between the adhering lids, constituting a state of *blepharosinechia*.

Dermoid Tumors.—These growths occur upon the primary ocular structures as the choroid plexus, internal parts of eye or cornea and due to aberration of growth. It is, moreover, quite evident that they arise with greater frequency as a result of arrested development when discovered upon the conjunctiva or nictitans membrane. While dermoids of abberation are difficult or, indeed, impossible to overcome without destruction to even the imperfect sight that may exist, those discovered upon the conjunctiva are quite available for treatment.

This benign growth is of solid consistency, immovable, usually situated partly upon the cornea and partly involving the conjunctiva, covered in animals, as a rule, with hairs that not infrequently are a source of ocular irritation; they are histologically the composition of skin, are invariably congenital and in the writer's experience, at least, seen more frequently in the bovine. Dermoids interfere with vision in a degree depending upon the extent of pupillary encroachment but can be ablated by careful dissection from the cornea, sclera or adjacent conjunctiva. A permanent cloud usually remains upon the cornea and the growth will be renewed if not entirely removed. These growths are believed to have origin through lack of normal amount of amniotic fluid, a condition tending to press the amnion against the lids, which in turn are crowded upon the eyeball, thus fostering attachment of a rudimentary portion of skin upon the cornea or sclera.

Lachrymal Duct Occlusion.—Occlusion or abnormal development in the lachrymal apparatus should likewise be briefly considered. As the parts included here are developed through a thickening of the ectoderm into a solid chain or cord of cells, and later through a degeneration of the central portion into the lachrymal duct and sac, it can easily be appreciated that absence of canal is possible as indeed it is recorded among congenital anomaly of the lachrymal apparatus.

Disturbances of Conjunctiva

The delicate character as well as continuous exposure of the mucous membrane lining the lids and anterior surface of the eyeball renders it especially susceptible to injury or disturbances of inflammatory nature; the former, indeed, oftentimes constitutes a primary etiologic factor toward conjunctivitis. It would be but idle time to attempt any systematic enumeration of those factors capable of producing traumata or to even suggest the ultimate effect an offending object might have upon either the primary or secondary ocular structures. In a general way, however, may be sighted such foreign bodies as hay chaff, dust, insects, etc., that become lodged in the conjunctival sac; wounds, contusions or lacerations from blows, nails, glass and various implements of stable and farm; again, irritating substances, chemicals, flames or bites of other animals, etc., etc. Likewise, inflammation of the conjunctiva is by no means entirely dependent upon injury; it occurs as a result of defective hygiene, through extension from blepharal disturbances, from eczema; moreover, bacterial influence plays an important role both in human and veterinary ophthalmic diseases being instrumental in causing inflammation varying both in type and severity.

Distinguished principally through a knowledge of its etiology, conjunctivitis is variously classified as conjunctivitis neonatorum (of the new-born); conjunctivitis vernalis (springtime); purulent conjunctivitis; phlyctenular conjunctivitis, etc. Besides these we must recognize those attacks peculiarly related to periodic ophthalmia, influenza, epizootic cellulitis and

canine distemper; again, the non-specific, acute or chronic catarrhal conjunctivitis that has as an etiologic base excessive irritation but free from bacterial or toxic influence. Eliminating, then, all varieties consequent upon any specific infection or determinable factor, we will consider symptomatology and therapy of what, for the sake of brevity and definiteness, may be termed catarrhal and purulent conjunctivitis. In the symptomatology of conjunctivitis, it is interesting and pertinent to determine that portion of the mucous membrane especially involved. As the circulation to this tissue is derived from two sources, the posterior conjunctival vessels and anterior ciliary vessels, it is readily possible to anticipate a varying aspect to the inflammatory injection; moreover, the degree of injection enables the diagnostician to estimate the intensiy of the inflammatory attack. When the posterior conjunctival vessels are more intensely implicated, there is to be observed a vivid scarlet or brick-red hue, this more generally associated with a local conjunctivitis; on the other hand, congestion of anterior ciliary vessels is associated with a rose-red hue about the circumference of the cornea, this is quite constant with corneal trouble or general ophthalmia.

Symptoms of acute conjunctivitis will vary whether of primary or secondary origin, with the degree of bodily resistance as well as depend upon the nature of etiologic influence. Mild attacks with either one or both eyes affected note frequently a primary involvement of the lids in the form of a blepharitis which present a redness, fullness, tendency to relaxation and edema, even chemosis if the palpebral membrane is implicated to any extent, which under such circumstances usually appears injected and smooth. At times petechial or ecchymotic discolorations are observed as a result of rupture of overdistended vessels; lachrymation, photophobia, itching and a feeling of warmth to the touch; mucus tends to accumulate about the canthi later becoming of a creamy purulent nature in those cases characterized as purulent conjunctivitis; this accumulation is inclined to produce adhesion between the upper and lower lid. Pain is not at all noteworthy, being more especially associated with ciliary congestion or the result of effect of foreign substances. The exhibitions of purulent conjunctivitis are practically the same, but of greater intensity and especially liable to be a secondary disturbance consequent upon attacks of distemper, pink eye or some other microorganic influence that has gained a foothold, directly or as a result of lessened resistance of the animal.

The termination of uncomplicated cases is usually resolution after from five to ten days' duration. A severe attack or a purulent conjunctivitis, however, may readily become complicated, passing into chronic conjunctivitis, keratitis, corneal ulceration or perforation iritis, or at times assuming a condition of ophthalmic catarrh, more especially when allowed to become protracted or if treatment is abusive through application of urine, tobacco juice or other empiric preparations not infrequently administered. Besides complications involving the ocular apparatus do we note excoriations and injurious reactions upon the surrounding skin.

In the therapy of conjunctivitis cold compresses applied early often serve to abort the trouble; later, hot fomentations of medicated water, using, for example, boracic acid, one ounce to quart, are indicated. For both acute or chronic forms of conjunctivitis the silver preparations are receiving special consideration and though nitrate of silver in solutions of from two to five percent strength, or protargal from five to fifteen percent are highly recommended, the writer has long used and prefers argyrol, in strengths varying from five to twenty-five percent, depending upon frequency of application, severity and duration of attack. Not only is this an efficient sedative, but it affords quick relief of the inflammatory condition. Astringent collyria containing alum or zinc sulphate are excellent applications between intervals indicated for employment of argyrol. Besides local treatment the patient should be kept out of intense light and darkened quarters are especially beneficial; moreover, food and exercise are to be limited to aid in lessening the inflammatory condition.

Disturbances of Cornea

When discoursing upon anatomy and physiology of ocular structures it was intimated that the transparent cornea is an especially important refractive media. As inflammation or traumata of the cornea invariably impairs this refractive power through diminution of transparency and a tendency toward an opacity of either transient or stationary character and, moreover, as prognosis of any morbid state of this tissue will depend largely upon the duration of this cloudiness, much importance must be placed upon early diagnosis and efficient therapeutic measures.

Eliminating all attempts to specify any etiologic influence operative in the development of corneal opacities, we will confine ourselves to its actual existence as a result of keratitis under the classification by Fuchs in his "Text Book of Ophthalmology," where the author divides all corneal inflammations into non-suppurative and suppurative keratitis, including among the former pannus, parenchymatous keratitis, or disturbances where the stroma of the cornea remains more or less intact and characterized by tendency for resorption of the inflammatory exudate. Sundry varieties of ulceration comprise the suppurative group and all are associated with localized destruction of corneal tissue.

Inflammation of the cornea may primarily show itself in any one or more of the series of layers of this tissue; the outer suffers more especially during conjunctivitis from trauma while idiopathic diseases involve the inner layers usually with other structures. Keratitis begins as an infiltration that constitutes an exudate which immediately produces diminished transparency; the luster of the corneal surface becomes lessened and the tissue over the area involved assumes a gray appearance. Should the process develop beyond this primary stage, blood vessels begin to grow out into the cornea from the margin; in pannus which constitutes the formation of new tissue, or a film-like growth involving the outer epithelial layer, these vessles are observed of a vivid red hue, coming from the conjunctival vessels; in parenchymatous keratitis, on the contrary, the new-formed vessels are more indefinite and seem to arise from the deeper-seated sclera. By this time sight is severely impaired and the process has reached its height to begin repair from the margins, the center of the cornea being the last to clear up. Many cases become entirely recovered through resorption of the exudate, but when the attack is at all protracted there is a tendency for the exudate to form new connective tissue and thus remain as a permanent impairment to both appearance and vision. In the suppurative keratiti the processes and symptoms are identical through the infiltration stage, but as result of inability of the stroma to maintain life in the exudate area there occurs destruction of that part of the cornea as an inclosed abscess or more commonly as a superficial ulceration through exfoliation of the epithelial layer with loss of substance and depression which produces irregularity to the corneal surface. The surrounding tissue is cloudy, floor of ulcer gray colored, marginal walls injected and these manifestations are associated with disturbed vision, lachrymation, photophobia, irritation, and occasionally pain, the latter symptoms not invariably though sometimes observed in the non-suppurative form.

The process may here become checked or progressing involve neighboring structures with complications of conjunctivitis, edema of lids, iritis, etc., again be instrumental in producing perforation with obliteration of the anterior chamber, or production of turbidity of its aqueous humor technically known as "hypopyon." The more favorable termination otherwise being new-formed, opaqua, cicatrized tissue.

Hypopyon is often free from pus organism owing to the leukocytes having emigrated from the deeper structure of the eye. This exudate falls to the bottom of the chamber and if uninfected is not of serious consequence; as a rule absorption of hypopyon is rapid without leaving any evidences of having occurred but occasionally through delay it assumes an organized consistency to remain in permanent evidence within the anterior chamber.

Therapy.—All cases of keratitis showing the least tendency toward lachrymation

(*Continued on page 53*)

WORLD'S WORK in Veterinary Science

A digest of all the Current Literature of Comparative Medicine

By Dr L. W Fetzer Washington. D.C.

THE use of the passive anaphylasis reaction as an aid for diagnosing glanders in horses. (N. N. Sirensky, Westnik Obschestwennor Weterinarii, Vol. 2, 1912, No. 2, p. 79.)—This reaction cannot be used as a diagnostic aid for glanders.

—

NOTES on the complement fixation reaction in tuberculosis. (A. T. Laird, Journ. of Med. Research, 1912, Vol. 27, No. 2, pp. 163–165.)—The complement fixation test when used with an antigen prepared from tubercle bacilli is at present of comparatively little value as a diagnostic agent. These tests were conducted with man.

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THE effect of giving sheep drinking water containing large amounts of magnesium chlorid. (A. Stutzer and S. Goy. Die Landwirtsch. Versuchs-Stationen 1912, Vol. 68, Nos. 3 and 4, pp. 233–246.)—No untoward effects; loss of weight, etc., were noted when sheep received drinking water containing much magnesium chlorid. A comparison was made with ordinary drinking water.

—

TREATMENT of tetanus by subcutaneous injections of pilocarpin. (Remond and Aouizerate. Recueil de Medecine Veterinaire [Alfort] 1912, Vol. 89, No. 12, pp. 259–260.)—Two cases of peracute tetanus in horses are reported upon, which were treated successfully by subcutaneous injections of pilocarpin nitrate. The first horse received an injection of 0.1 Gms. of the alkaliod thrice daily for four days, and the second animal the same number of injections for eight days.

A CASE of natural immunity against rabies virus. (J. Viala. Ann. de l'Inst. Pasteur, 1912, Vol. 26, p. 3.)—This article describes a case of natural immunity in a rabbit which received three subdural injections of fixed virus without showing any disturbances. The blood of this animal was rabicidal in so far that when it was inoculated into other animals with fixed virus the treated animals showed a passive immunity.

—

TREATMENT of contagious vaginal catarrh. (H. Kratzer. [Yearly Report of Bavarian Veterinarians] Münch. Tierärztl. Wochenschr., 1912, Vol. 56, No. 42, p. 755.)—The vaginal mucous membrane is rubbed with a rough piece of linen cloth and then painted with a ten percent alcoholic solution of pyoktanin. The treatment is repeated each day for eight to twenty days until a complete cure has been affected.

In addition to this it is necessary to disinfect the floors of the barns thoroughly. This is considered a cheap and effective method.

—

TREATMENT of lumbago in horses with diastase. (A. Waldeck, Münch. Tierärztl. Wochenschr. 1912, Vol. 56, No. 21, pp. 377–379.)—Going out from the premises that if it were possible to hydrolize the glycogen which accumulates in the muscles into maltose and other products, a method for treating this condition would be found. Intra-muscular and subcutaneous injections of diastase proved that good results could be obtained from such treatment. For the purpose two grams of diastase were injected both subcutaneously and intra-

venously once or twice during a period of twenty-four hours. In four severe cases improvement was noted within twenty-four to forty-eight hours.

—

CONDITION powders; their constituents, examination and judgment. (O. V. Czadek Zeitschr. fur Landwirtschftl. Versuchswesen in Oestereich, 1912, Vol. XV, No. 8, pp. 1037–38.)—The components which usually go to make up these powders are as follows: fennugreek, anise, fennel, buckthorn bark, licorice root, marshmallow, sage, peppermint, juniper berries, senna leaves, wormwood, calamus, gention, St. John's bread, salt, arsenic, lime carbonate, sulphur, sulphide of antimony, glauber salts, bone ash, epsom salts, and feed lime. The major portion of these preparations (filler) are usually either bran, rice hulls, millet hulls, or feed meal.

—

THE resorption of drugs in ointments having different bases. (F. Sauerland, Biochem. Zeitschr. 1912, Vol. 40, p. 66.)—The drugs used in these tests were iodine (Iodthion) and salicylic acid preparations, and as a measure of absorption, the output of the respective drugs in the urine was employed. It was found that the absorption of the drug was greatly influenced by the ointment base used. The absorption of Iodthion and methylsalicylate was greatest with petroleum jelly (Petrolatum U. S. P.) less with lard, and least with lanolin (adeps Lanae U. S. P.). Spirosal was absorbed to a larger extent with a lanolin base, next came petroleum jelly and last lard. Saligen was absorbed best with a lard base.

—

CHEMOTHERAPEUTIC tests with adrenalin and substances having a similar constitution with animals affected with tumors. (H. Engel, Zeitschr. f. experiment. Path. u. Therapie, 1912, Vol. 11, No. 1, pp. 9–39.)—In these tests synthetic adrenalin l-suprarenin, dioxyphenylaminoketon, rac-suprarenin, d. suprarenin, dioxyphenylaminoketon, oxyphenyethylamin, dioxyphenylethylannin, amylamin, and isoamylamin. Inhibition of the tumorous growth in rats was most markedly noted with the first two substances, namely adrenalin and l-suprarenin. The action of the remaining substances was in the order presented above with the exception of the latter four which showed no action at all. The necrosis produced by these growths cannot be attributed entirely to the production of an anemia.

—

TREATMENT of an obstinate case of eczema with salvarsan. (Chief Vet. Mathies Zeitschr. f. Veterinärk. 1912., Vol. 24, No. 7, pp. 333–335.)—This is a description of a case of eczema in a horse which occurred periodically every summer and which did not respond to the regular methods of treatment. The administration of arsenic, used in conjunction with the regular treatments only remedied the conditions temporarily. When salvarsan was injected, i. e., two grams in 20 Cc. of 0.9 percent salt solution and 3.8 Cc. of a four percent solution of sodium hydroxid, all itching ceased in a few days; and after fourteen days a complete cure was effected. The injection was repeated after thirty days. In four weeks the hair grew on the parts previously affected. The condition did not recur the following year.

—

MUSCULAR rheumatism in the horse (J. Huber, Münch. Tierärztl. Wochenschr., 1912, Vol. 56, No. 30, pp. 543–544.).—A 12-year-old gelding showed large slightly painful bilateral swellings of the shoulder and humerus. The movements of both fore feet were stiff and the steps were short. The pulse of the animal was seventy-two, respiration thirty, and temperature 39.5° C. (103.1° F.). The appetite was good. The treatment given the animal consisted of massage, warm poultices hypodermic injection of pilocarpin and internal administration of sodium salicylate.

After two days the muscles of the back and femur became involved and an intermittent fever which rose to 41° C. (105.8° F.) set in. Six days later the left hind hoof was affected, became inflamed which was treated by Immingers method. Only after fourteen days was the horse able to get up, but a pronounced stiffness of the hind legs remained. As this stiffness of the limbs showed no permanent improvement after a period of three months, all kinds of remedies having been tried, the horse was slaughtered.

On dissection the muscles of the back were found to be light yellow in color and in some localities were composed of a jelly-like mass.

—

HISTOLOGICAL and experimental studies in regard to deaths caused by salvarsan. (Th. v. Marschalko and D. Veszpremi. Deutsch. Mediz. Wochenschr., 1912, Vol. 38, No. 26, pp. 1222–1225.)—The deaths supposed to be caused by encephalitis after administering salvarsan are according to these authors directly due to the toxic action of this drug itself. Multiple hemorrhages were found in the brain which were produced by the stagnation of the blood current, stasis and the formation of thrombi. The administration of an endotoxin prepared from water bacteria did not reduce the toxicity of this preparation. Nerve tissue was apparently not affected.

—

EXPERIMENTS to determine the safe dose of white arsenic, Cooper's dip, and bluestone for sheep. (Arnold Theiler, The Agricultural Journal, of the Union of South Africa [1912], Vol. III, No. 3, pp. 321, 325, 327, 329, 331, 333, 334, 346.)—On looking through the literature the author has noticed that the toxicology of these various drugs has never been properly worked up, and no reliable data are to be obtained as to the maximal and minimal doses of any of these drugs.

Taking these facts into consideration, and knowing that the drugs are undoubtedly effective in the treatment of sheep for wire-worms, either separately or jointly, the author was induced to undertake an unusually larger series of experiments on sheep, with the object of arriving at the maximal reliable dose of these drugs, and of the mixtures which come into consideration.

It appears that arsenious oxid in the dose of fifteen, thirty, and forty-five grains is a safe dose for sheep, but it would not be wise to use the largest dose on a great number of sheep.

Cooper's dip administered to sheep in the doses of fifteen grains had no fatal effect on thirty sheep. The fifteen sheep belonging to the lot of "watered twenty-four hours previous to and after dosing" were noticed to be "off feed" the day following.

With the dose of thirty grains, forty-eight sheep were dosed, and one died the following day.

With the doses of forty-five grains, thirty sheep were dosed, and four died. Two of the sheep died within forty-eight hours. They belonged to a lot "watered immediately after dosing." Two died on the seventh and eighth days, respectively; these latter were watered twenty-four hours after dosing.

The dose of twenty-two grains of bluestone appears to represent a safe dose for sheep; it may probably be slightly increased.

The dose of thirty grains of white arsenic, mixed with thirty grains of bluestone, does not appear to be a safe dose for sheep.

The dose of fifteen grains of Cooper's dip, added to fifteen grains of bluestone, given in a mixture, seems to be a safe dose for a sheep.

The addition of the non-poisonous materials, salt and sulphur, in equal parts, to an otherwise safe dose of Cooper's dip and bluestone, appears to render the mixture dangerous for sheep. Accordingly, in a mixture which contains salt and sulphur, the maximal dose of Cooper's dip and bluestone cannot be given, and, therefore, when the safe effect both of Cooper's dip and bluestone is expected, it is not advisable to add any other constituents to this mixture of the two.

—

ACTION of Ehrlich-Hata's 606 upon the causative organism of Beschalenseuche. (F. Favero. La Clin. Veterin. 1912, Vol. 35, No. 4, pp. 150–151.)—Beschalenseuche a disease resembling dourine and caused by Trypanasoma equiperdum was successfully treated with dioxydiamidoarsenobenzol, which is better known as salvarsan or 606. The tests reported were conducted with dogs who received 10 Cc. of virus and 12 Cgm. of salvarsan per kilogram of body weight, either during the period of incubation or when the disease was at its height.

When the remedy was injected during the incubation period or simultaneously with the virus the disease in most cases did not manifest itself at all. When given at the time when the disease was well under way the trypanasomes were absent from the blood the day following the injection.

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D. M. Campbell

ILLINOIS OLDEST AMONG THE STATE VETERINARY ASSOCIATIONS

Elsewhere is given a brief account of the recent meeting of the Illinois State Veterinary Medical Association taken from *The Breeder's Gazette.* Most of our readers know *The Breeder's Gazette* and the large field in animal industry which it covers. Very few state veterinary meetings are considered by its editors as of sufficient importance to merit space in their columns, and not even meetings of the A. V. M. A. have received as much attention or as commendatory comment as did the Illinois meeting, and best of all, it can be said without qualification that the Illinois meeting deserved all the good things that have been said of it.

We believe that no other state veterinary association has yet celebrated its *thirtieth* anniversary. The state of Pennsylvania with an organization extending back over twenty-nine years comes nearest to it. The Iowa State Veterinary Medical Association which has just celebrated its twenty-fifth anniversary is probably third in age, with New York a close fourth.

The Illinois State Veterinary Association is also probably first among the state associations in membership, having a paid up membership of nearly six hundred. The thirtieth anniversary meeting was held in Chicago, in which there are more veterinarians than in any other city in the world, and where there are also more veterinary students enrolled than in any other city in the world.

The success of the meeting was largely due to the management of the association's efficient secretary, Dr. L. A. Merillat.

WHERE DOES THE VETERINARIAN COME IN?

President Andrew M. Soule of the Georgia State College of Agriculture has sent a letter to each of the three hundred bankers of the state, in which he urges them to use their (the bankers') influence to extend the distribution of the state antihog-cholera serum.

President Soule reminds the bankers that the estimated loss from hog cholera in Georgia is more than a million dollars a year, and urges them to advance money, if necessary, to the patrons for the purchase of the antihog-cholera serum to protect their herds.

It is stated that orders for serum must be accompanied by check or money order, and that syringes for administering the serum are furnished at cost and may be returned, after use.

The inference is, if the Georgia veterinarians want the work that is rightly theirs, they should, among other things, go into the banking business.

ARMY VETERINARY BILL ON THE "UNANIMOUS CONSENT" LIST

During the latter months of the last session of Congsess and the first weeks of this session great effort has been put forth by Dr. W. Horace Hoskins and others to have the Army Veterinary Bill brought before the house under the head of "unfinished business," but it has not been possible to do this and as the indications now are that it would not be reached in the House on this calendar during the remaining weeks of the session it has been

(Continued on page 69)

POINTED OPINIONS by Readers ON LIVE TOPICS of Veterinary Medicine

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the thanks of the editor, the approval of the veterinary profession and the lasting gratitude of those who are aided by your suggestions.

The Business Side of Practice*

DOCTOR HUSTLER keeps his business and professional records by the card system. He knows daily to the cent how all the business and money details stand. You do not have to ask him for a bill. For his office work he will expect the cash each time, or for a course of treatments in advance. For his calling business, he will tell you at the end of the case, and again the first of the month. If there is no settlement then he will be around to know the reason why. All pleasant and nice about it, but you can see Doctor Hustler means business. People soon know he has got to be paid, but his fees are reasonable and modest. He collects all or nearly all he charges on his books. If he does a charity case he calls it so, and that ends it. Gradually people come to know Doctor Hustler means money, but people like what they pay for and they will declare they rather have Doctor Hustler at any price than Doctor Easygoer for nothing. Doctor Hustler delivers the goods and collects his pay—kindly and fairly, with no tricking, or bamboozle, but he gets it.†

Not only does he collect his pay, but he pays his own bills. His credit is good because he does not use it much or badly. He is very careful and choice about his own business credit. Doctor Hustler is not one of these policy-mongers and bluffers. He is not looking for some new excuse or pretext with which to flim-flam the people, playing with psychological means. New fee-getting machines of little or no therapeutic value, do not interest him. He is not a weak-kneed individual that must fall back upon make-believe and placebo in order to make a living.

Doctor Hustler is competent, kind, orderly, systematic, clean, clear-cut, hits from the shoulder, wants his money and gets it, knows what he knows and tries to know more every day, works hard, plays some, smiles a good deal, makes a good friend and an indifferent enemy, believes in purging the mind as well as the body of all corruption, and above all one on whose judgment you can rely, because he is rational and sound, and one whose confidence is never abused, because he is true. He cultivates that saving sense of humor which makes the world look good and life worth living.

If you are not a Doctor Hustler, what are you?

*From *The Physicians Drug News.*

†In the writer's business, ranging from $5000 to $10,000 a year, he has lost but about $2 a year in the past four years.

ILLINOIS VETERINARY MEDICAL ASSOCIATION

The thirtieth anniversary of the Illinois State Veterinary Medical Association was held at the Lexington Hotel, Chicago, Dec. 5–7, with about 350 members present, Dr. Jas. Smellie presiding. A special program was prepared for the occasion and a number of members of the veterinary profession from distant states presented papers or otherwise took active part in the proceedings. Among the subjects of more

general interest discussed may be mentioned "Forage Poisoning With Special Reference to the Recent Outbreak in the Western States," by Dr. Jno. R. Mohler of the Bureau of Animal Industry; "Contagious Abortion," by Prof. B. F. Kaupp of Colorado; "Open Tuberculosis," by Dr. A. T. Peters of the Illinois State Laboratory; "Rabies as a Sanitary Problem," by Dr. C. A. White, Chicago; "Illinois Stallion Registration Law," by Dr. J. M. Wright, state veterinarian, and ably discussed by Dr. A. S. Alexander of Wisconsin; "Some of the More Important Insects Affecting Our Farm Animals," by Dr. W. H. Dalrymple, Louisiana State University.

The last day of the session was devoted exclusively to clinical work at the Chicago Veterinary College. On the night of Dec. 5 a most interesting and instructive illustrated lecture on "Cancer of Domestic Animals" was delivered by Prof. Maxmilian Herzog of Chicago. The annual banquet was held on the night of Dec. 6 and was well attended, a number of invited guests being present, and some very appropriate post-prandial addresses delivered.

Altogether the thirtieth anniversary of this association was a success in every way. Dr. J. F. Ryan, Chicago, was elected president for the ensuing year and Dr. L. A. Merillat, Chicago, was reelected secretary-treasurer.—*Breeders Gazette.*

ARECOLINE A DIAGNOSTIC FOR "HEAVES"

In the November issue of VETERINARY MEDICINE I notice, in the discussion of the administration of arecoline to horses, suffering from so-called heaves, the fact has not been mentioned that in this condition we usually have a hypertrophic and weakened heart, a fact demonstrated by the bad effects of anesthetics on these cases.

We also notice that animals having pulmonary emphysema die very suddenly sometimes from no other apparent cause than heart failure. I believe in most cases where we get bad results from the administration of arecoline in animals having the disease, it is due to the depressing effect of the drug on an already diseased and weakened heart.

I am a great friend of arecoline, but always inquire as to whether the animal has the "heaves" before giving it. However, I have used it in one-half-grain doses subcutaneously for diagnostic purposes in suspected cases. It certainly brings out the symptoms, if the disease is present.

B. E. MILLER, D. V. M.
Nashville, Mich.

WHEREIN LIES THE DANGER IN DRENCHING HOGS

I would like to hear some one's opinion as to the cause of death in hogs from being drenched. I have seen them fall over in clonic spasms and die after being given small quantities of liquid with a dose syringe and also after having been given simple mixtures through a rubber hose and being allowed to chew the end of it and swallow naturally.

Can it be possible that they get enough into the lungs under these conditions to cause death?

B. E. MILLER, D. V. M.
Nashville, Mich.

ASCARIDES SUILLÆ IN THE PERITONEAL CAVITY*

The subject of this case was a young sow, ten or eleven weeks old. She was in good condition and had always appeared quite healthy and as strong as any of the other eight pigs which made up the litter. On Friday afternoon the sow did not seem very well and refused her food, and she was found dead on the following Saturday morning. I made a postmortem examination on Saturday, and on opening the abdomen found a dozen or so of worms—*Ascaris suillæ* (or *Lumbricoides*)—in the peritoneal cavity. These worms were alive and were distributed all over the abdomen, some being found between coils of the intestine, and one was found on the posterior surface of the liver. There was evidence of a general, evenly distributed peritonitis with a large quantity of yellow lymph-like deposit. This deposit was particularly thick around the posterior surface of the

*Reprint from *The Veterinary News.*

stomach and the duodenum. The deposit had caused the gastric omentum to adhere very closely to the stomach. There was nothing whatever to suggest there having been any septic infection of the peritoneum.

The intestines were much inflamed and all the coats of the bowel much thickened. I was not able to locate the place where perforation occurred, neither were any distended cavities filled with pus found on the bowel, such as have been described in cases of perforation of the bowel by *A. marginata.*

My own theory is that a very small ulceration took place which healed up without allowing sufficient ingesta to pass through to cause septic peritonitis, but that by some means one or more eggs or immature worms passed through the bowel and then these developed and multiplied in the peritoneal cavity.

I have not been able to find any reference to such a case as this in the pig and I shall be very pleased to hear if any of your readers have met with a similar condition. RALPH BENNETT.

Romford, England.

OPHTHALMIA

(*Continued from page 45*)

and photophobia should be housed in darkened quarters and are often primarily benefited by warm medicated compresses. When considerable sensitiveness is manifest by symptoms of pain and photophobia, dionin appears to be especially beneficial through its sedative and analgesic properties. Atropin has long been lauded in keratitis for its mydriatic influence toward preventing adhesion of cornea and iris; cocain, though likewise having the same power to dilate the pupil, is contraindicated because it is liable to increase tendency of ulceration as its action is associated with diminished corneal nutrition.

Cloudiness of cornea is often cleared through dusting calomel into the conjunctival sac; it is, however, contraindicated with internal administration of preparations of iodin. Should the cornea seem densely clouded as result of disturbances simulating or characterized as pannus and parenchymatous keratitis when at times calomel appears ineffectual, caustics are indicated, preferably silver nitrate in solutions varying in strength from two to five percent. Ulcers coincident with debilitating disease thus treated are substantially benefited through the conjointed aid of internal administration of cod liver oil, arsenic, iron, etc.; infectious ulcers may be touched with pure phenol while indolent ones often yield to absolute alcohol.

Paracentesis of the cornea is often advised in instances of indolent or deep ulcers accomplishing the two-fold purpose of controlling the bulging of the iris that usually becomes coincident to spontaneous rupture and, likewise, it serves to diminish the extent of the future cicatricial tissue as the operation invariably appears to check any further ulcerous tendency. Again, paracentesis is necessary in severe instances of hypopyon in order to evacuate the anterior chamber; here, however, the operation should not be tried until absorption of the exudate has been attempted and adrenalin seems to do excellent work in this instance, while it also aids in reducing congestion in surrounding structures. The resulting scar may be removed or materially lessened by use of yellow oxide of mercury and dionin, the latter possessing valuable lymphagogic qualities.

References: Sessions, "Veterinary Anatomy." Howells, "Text Book on Physiology." Doane, "Text Book of Ophthalmology."

PAINLESS INJECTION FOR SWEENEY

I have been quite interested in the discussion going on about turpentine injection for atrophy of the shoulder commonly known as sweeney, etc., and the use of anesthesia. I am a United States veterinary inspector now and not doing any practice, but in an experience of seventeen years, in active practice, part of which has been in this great southwest country where facilities are quite hard to make enticing for nice work, I have followed the practice of anesthesia in horses with chloroform, and ether in dogs, with simply a piece of of canvas, molded in the shape of a muzzle and a sponge with no bad results and I always attributed the excellent results to the fact that I got plenty of air mixed

with the inhalation. Now I see that others claim the same good results by excluding all of the air that they can.

As to the anesthetic to be combined with turpentine for sweeney, I used the following formula, and if you will rub some on your hands and try to feel anything for the next several hours you will find that the feeling is certainly suspended.

Oleum terebinthinæ.....dr. iv
Acid carbol.....dr. ii
Aqua dest., q. s. ad.....oz. i

This is to be well shaken and injected and if there has ever been an abscess or any bad effects from its use I have never seen it, although I have used it for several years.

W. A. SAVAGE, M. D. C.
Tucumcari, N. M.

TO MAKE A GOOD TWITCH

Take an old brace which is used to hold up a buggy top and tie a small piece of rope in the hole in each end. After twisting one end on the nose "break" the brace and tie the other end to the halter. This makes the handiest kind of a contrivance as no assistant is needed to hold it, and it stays on much better than an ordinary "stick" twitch. Try it.

J. E. NANCE, D. V. S.
Anadarko, Okla.

SUCCESSFUL TREATMENT FOR BLOODY MILK

Being located within the "Chicago Milk District," my practice is largely with dairy cows and, of course, calls to treat cows giving bloody milk are very common.

During the past three years I have used a very simple treatment, the inflation of the udder with air, the same as we do for parturient paresis, with perfect success in every case.

Only one inflation has been necessary, except in one case, which required two, and the cure has been immediate, as prompt as the recovery from parturient paresis from the same treatment.

I fill the udder very full of air, using aseptic precautions just as we do for milk fever and tie a tape on each teat, or on each affected teat and allow it to remain six or seven hours and presto! the thing is done, and blood shows up in the milk only for the next milking.

I am not able to explain how this treatment brings about recovery. Possibly bloody milk may be due to some organism that cannot live in the presence of oxygen, but this I doubt, since symptoms of inflammation are usually absent in these cases. Again, blood in the milk may be due simply to a leakage, an extravasion from the capillaries, and this may be prevented by the mechanical pressure of the air, during the inflation.

In any event the treatment is a successful one and that is what the dairyman wants. Some of these cases were recent ones, others of two or three weeks' duration. Most of them had not received any previous treatment, but a few had been treated with every home remedy known, without success.

W. B. WISE.
Sheffield, Ill.

ASSOCIATION OF LIVE STOCK SANITARY BOARDS*

The annual meeting of the Association of Live Stock Sanitary Boards held at the Sherman House, Chicago, Dec. 3-5, dealt chiefly with problems of large interest to American breeders. The eradication of the southern cattle tick, the prevention and control of hog cholera by the use of antihog-cholera serum and contagious abortion were the subjects which received special attention. In relation to tick eradication the fact was clearly established that this work is a success. An area of 165,000 square miles (larger than the states of Mississippi, Alabama and Georgia combined) has been cleared of ticks and released from quarantine. The methods which have been developed, the interest shown in the work by the cattlemen of the South, and the results obtained by the work already done, as shown by the discussions, make it plain that larger Federal appropriations are needed for this work. The Federal appropriations have not increased so rapidly as those made or expended by the states and counties. A resolution asking for a larger Federal appropriation was adopted.

*From *The Breeder's Gazette.*

The discussion of hog cholera and the use of serum for its prevention and control developed an unanimous opinion, held by those using the antihog-cholera serum, that the use of serum was of great value in the prevention and control of the disease so far as the individual hog-owner is concerned, but there was much difference of opinion as to the final results of the use of the double or simultaneous method of using the serum, some of the sanitarians objecting to the use of the double method. All agreed that when the double treatment with serum and virus or the active germs of the disease was practical that none but veterinarians who had been specially trained in the work should be employed.

That a tremendous step forward has been made by the serum science none will doubt, but the discussions plainly indicated that the problem of the control of hog cholera was yet a long way from satisfactory solution. Dr. Paul Fischer, state veterinarian of Ohio, presented comprehensive plans for the complete control and final eradication of cholera, but owing to the large expenditures involved made no claim for their practicability at present. He did, however, advocate the trial of his plans on a single county to start with, in order to demonstrate the value or economy of eradicating hog cholera, even though large expenditures of money were necessary.

On the motion of Dr. Fischer a committee was appointed to report suitable plans and regulations which may be uniformly adopted for the control of hog cholera and report at the next meeting. The members of that committee are Dr. Paul Fischer of Ohio, chairman; Dr. A. T. Peters of Illinois, Dr. W. H. Dalrymple of Louisiana, Dr. Marion Dorsett of the Bureau of Animal Industry and Dr. A. T. Kinsley of Kansas City, Mo.

Dr. W. L. Williams of Cornell University presented the results of a large amount of clinical observation of that scourge of the cattle breeder, contagious abortion. This is probably the most important contribution to the knowledge of this disease from a practical standpoint which has been made in recent years. The practical points especially brought out were that the generally accepted belief that two or more abortions tended to produce an immunity to the disease has little foundation in fact. Dr. Williams' observations showed, however, that age seemed to constitute some degree of immunity. The second point of importance is that up to the present no method of prevention or control has been found that is of any avail in dealing with the trouble. Segregation and disinfection, so generally advised, are, according to Dr. Williams and many others who have had large experience in dealing with contagious abortion, of little value in controlling the disease. The bull is the chief means of spreading it.

The resolutions passed by the Association were not obtained. When the Association went into executive session representatives of the press were excluded.

The paper by Dr. O. E. Dyson, suggesting the establishment of an "Advanced Registration" for herds of pure-bred cattle free from tuberculosis dealt with a question of great importance. "If such a system of registration were established by state and Federal authorities it could not fail to be of tremendous value in encouraging the freeing of pure-bred herds from tuberculosis and keeping then free," said Dr. Dyson.

CHLOROFORMING HORSES WHILE STANDING*

As the use of anesthetics is occupying considerable attention at the present time, I purpose, for the benefit of those who have never tried it, to explain how really simple is the *modus operandi* of giving chloroform to a horse while standing.

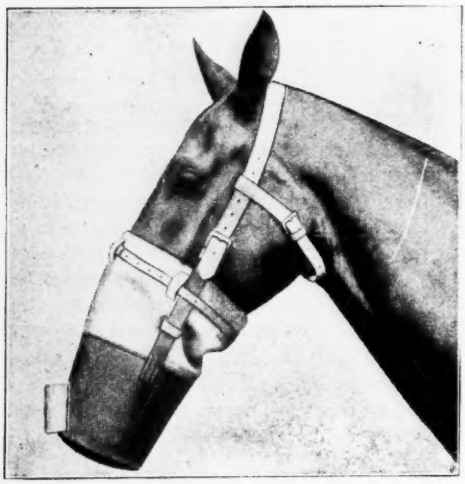
Many practitioners would use chloroform oftener than they do if it was not for the trouble of casting and risk of injury to the animal.

I cannot speak too highly of the convenience and safety of this method. There is almost an entire absence of risk of injury because the animals offer no muscular resistance to the fall. They make no effort to save themselves—they can't—and therefore there are no sprains, etc., caused. I have always found clients liked it for their horses, because it was simple and painless, no hobbles, and not more than two men are

*Reprinted from *The Veterinary Record*, London.

required. It is a very useful method to adopt when foaling a mare.

Having selected a suitable spot—a straw yard or grass paddock, place a strong cart rope around the animal's neck behind the jaws and have two men holding it. Put the chloroform on the sponge and place it in the "mask," slip the mask on, and adjust the straps around the face; the animal may stand perfectly still and gradually sit down, or he may trot around a time or two, or he may rear up, but the men holding the neck-rope can steady him, and in a very few minutes he is quite "under," and you can operate without any fastenings whatever. You may use a rope to draw a leg out of the way of the other ones. When finished simply slip off the mask and allow the animal to rise when it feels inclined.



Method of chloroforming a horse standing

I enclosed drawing of the mask I have used; it is made entirely of leather, and can be adjusted to fit either a small pony or a big cart horse. It has an opening in front which is used either to admit air or to put chloroform on the sponge should more be required.

GEO. E. GIBSON, M. R. C. V. S.
Newport Pagnell.

ENCLOSED find my subscription for VETERINARY MEDICINE. It is a great work. I would not be without it. P. J. LYNCHKE, D. V. S.
Carp, Ont., Canada.

OSTEOPOROSIS—SPONTANEOUS RECOVERY

During December, 1911, I was called to see an eleven-year-old pony, thirteen hands high, the property of a meat dealer in this city.

The animal was quite lame in left foreleg. After a careful examination no positive diagnosis was made at the time. In a few days the leg, up to the knee, was quite warm and considerably tumified; the foot was hot, also. After a few days the right foreleg and foot showed the same symptoms.

A few days later the same manifestations appeared in both hind legs and feet, with slight swelling of inferior maxilla and nasal bones. The facial enlargement afterwards increased greatly.

During all of this period the pony had laid down most of the time, had a poor appetite and lost flesh rapidly.

Treatment was pursued during the first two weeks only and consisted of poulticing of front feet and hot bandages to same limbs.

After the development of the head swellings I made a diagnosis of osteoporosis and suggested treating with calcium phosphate and possibly with other preparations, but the owner, being ill at the time, concluded to let the pony take his chances, so we trusted to the ministrations of *vis medicatrix maturæ*.

During June, 1912, the pony was put on pasture and returned home in November; with the exception of a very slight facial enlargement the animal seems sound, except for a slight stiffness of gait. He had, however, showed this same gait for two or three years previous to the onset of the attack of osteoporosis.

In this connection an abstract, taken from the *Tropical Veterinary Bulletin* (October 1912), of an article on osteomalacia in the horse (published in the *Rev. Gen. de Med. Veter.*) is of interest. It follows:

Osteomalacia is in the opinion of the author an infectious disease and is characterized essentially by a progressive demineralisation of the bones.

Clinically the disease is recognized by lameness, pathognomic swelling of the bones of the head and jaws, detachment of ligaments and tendons from the bones, fractures, and frequently considerable wasting.

The lesions, which principally involve the osseous tissue and the bone marrow, are in the nature of a generalized osteomyelitis.

The author states that the disease termed osteomalacia occurring in the horse is entirely different from the conditions grouped under the same name occurring in other species of animals. The name is misnomer since in the horse death occurs before the bones have become really soft.

The author gives a brief review of the literature on the subject and also mentions the occurrence of the disease in different parts of the world which in temperate countries is sporadic, and in hot countries endemic and epidemic.

The author has seen cases in animals of all ages, the majority occurring in four- or five-year-olds. Cases occur at all altitudes, in males and females, animals well-fed and ill-fed, and in animals at grass or in the stable.

Animals have been followed for periods of years, but the author has not been able to convince himself that the disease is hereditary. Animals that are used too young are more likely to be attacked than others, and certain races are less resistant than others.

The disease appears to persist in certain places, and this suggests the possibility that it is contagious.

The author's investigations have been directed towards verifying the contagious nature of the disease, studying the pathological anatomy of the disease, and attempting treatment.

In his search for the causal organism the author has not arrived at any definite result. Material has been taken from the bone marrow, synovia, and blood, and a number of ordinary and special media have been employed in attempts to cultivate it but without result.

A variety of organisms have been cultivated from such materials taken with aseptic precautions from animals either living or just dead. The majority of the cultures remained sterile or yielded a small micrococcus which appears "special" to Carougeau.

This organism is very small and frequently occurs in the form of diplococci. Cultures are very meagre, there being a a scarcely perceptible growth on agar and only a faint opalescence in broth.

Abundant growths have never been obtained and subcultures have always proved sterile.

Microscopic examination of various materials has not yielded any interesting results.

Blood and materials derived from lesions have been used for inoculation experiments.

1. Horse.—Horses have been inoculated with blood, bone marrow, and bone ground up with sterile broth and filtered, but the results have been negative in every case.

Contact experiments have also failed to transmit the disease to healthy horses.

One experiment was made to transmit the disease to an ox by inoculating it subcutaneously with bone marrow. This also failed. Similarly, experiments with goats, sheep, dogs, rabbits, guinea-pigs, and, with one possible exception, pigs have also proved negative. The author's opinion that the disease is infectious is based upon the following considerations:

The occurrence of the disease under a variety of conditions of feeding, climate, and geological formations compels one to suppose that none of these conditions has a preponderating influence on the causation of the disease. On the other hand the repeated occurrence of the disease in certain places and certain stables suggests that it is of an infective nature. This view is supported by the nature of the lesions, which are those of a chronic irritation.

There is no doubt that defective feeding, inattention to hygiene and so on are contributing causes owing to the decrease of resistance occasioned, but in the author's view there is some essential factor.

Examination of the lesions shows that there is every evidence of active irritation; the bones are not simply decalcified. The inflammatory process is evidenced by the resorption of layers of osseous tissue, the

formation of osteoid tissue, the production of a large amount of vascular connective tissue, and finally the nature of lesions in the marrow.

In the early stages it is the bone marrow that is principally involved; the disease is therefore an osteomyelitis which subsequently extends to the osseous tissue and joints.

The theory of infection also explains the digestive disorders always met with in cases of osteomalacia. There is always an unusually excessive elimination of phosphoric acid and calcium, but the quantity eliminated varies from time to time during the course of the disease, being generally greater in the early stages and in many cases nil in the last stages.

The author is of opinion that osteomalacia and rickets are two distinct conditions in the horse.

The lesions involve the bones and the joints and are in the nature of a generalized rarifying ostitis. All the other lesions found in cases of the disease are due to anemia or general cachexia; there are never generalized lesions. Lesions never occur in the internal organs, save such as are of a secondary nature.

Any of the bones may be affected and the nature of the change is the same in all cases. The bones become lighter, and swollen, and lose their hard, compact structure, the bone being converted into a porous, sponge-like material which can be easily broken with the fingers. The long bones are less seriously affected than the others, and it is the bones of the head and the jaws that show the most marked alterations.

Joint lesions are constant and are generally more severe in the upper joints of the limbs than the lower ones.

Fractures occur commonly.

The medullary canal is always enlarged and the marrow has a pronounced red color, although at the center of the shaft of long bones it may be yellow. Even here there are often hemorrhages. In some cases the marrow resembles spleen pulp. The spaces in the cancellous tissue are enlarged.

Analysis of the bones shows that there is a diminution in the proportion of mineral matter and an increase in the animal matter, the variation depending upon the stage of the disease.

Microscopically the lesion is found to be the replacement of bony tissue by vascular connective tissue. This process may occur in any of the bones, but it is more marked in bones of fibrous origin than in those of cartilaginous origin.

The periosteum is found to be thickened, and beneath this the bone tissue becomes more and more rarified the deeper one examines it from the surface.

Lesions occur in the bone marrow in every case and at all stages of the disease. There is an absence of fat-containing cells and a multiplication of the medullary cells associated with extravasation of blood. Masses of red or yellowish blood pigment may be seen at places. In the later stages there is always some formation of fibrous tissue.

Previous to the deformation of the bones the symptoms presented are those that are to be expected in a disease of this kind.

As already mentioned, fractures commonly occur and it is not uncommon for ligaments and tendons to become detached from the bones even in the early stages of the disease.

Examination of the urine shows that the excretion of phosphoric acid is excessive. Whereas the urine of the horse normally contains about 40–80 centigrammes of phosphoric acid per day the author has found as much as 12.5 Grams per liter in a case of osteomalacia. The quantity excreted varies from case to case and from day to day in the same case.

The alkalinity of the blood is decreased, but in the case of recovery this returns to the normal. The number of red corpuscles may fall as low as 2,500,000 and there is also a decrease in the amount of hemoglobin. The leukocytes increase in number, but the differential counts vary greatly.

The course of the disease is slowly progressive, although at times there may be exacerbations which suddenly render an animal unfit for any work. Recovery is possible even when there are advanced lesions, but such recoveries are exceptional.

Treatment.—Attention to hygiene is of great value in the treatment of the disease. Animals should be left at rest at pasture.

Adrenalin appears to have a beneficial effect, but it proves too costly to be used very extensively.

Lime and magnesium salts have been used with good effect, as also have arsenic and mercury, the latter being administered intramuscularly in the form of calomel.

The author suggests that anhydro-oxy-methyleine-diphosphoric acid may prove to be a valuable remedy, though he has not actually tried it.

E. P. SMITHERS, V. S

Vincennes, Ind.

CASE OF LIVER HYPERTROPHY

Subject a weanling foal of 1912. The trainer of this embryo trotter was giving him his usual morning "kindergarten" work; he appeared to be in excellent health and had been "jogged" about one-half mile in a very light cart, when he suddenly stopped; the trainer got out of the cart and made an examination and came to the conclusion that he was "corded up." It was with great difficulty that he was able to get the colt back to the stable.

I was 'phoned for, and found the following symptoms: pulse 62; temperature 105° F.; respiration slightly increased; mucous membranes tinged with yellow; no pain. This was at 9:30 a. m., November 11th.

At noon he ate a small amount of green grass. Pulse was then 62 per minute and his temperature 104° F. At 5:30 p. m., the condition of the pulse and temperature was better, respiration increased in frequency, no pain. Patient ate a small amount of wet feed. At 10 p. m. pulse, temperature and respiration same as above, no pain. The attendant said that he had a good night.

November 12th, 4 a. m., attendant reported much better, laying down and had no pain. At 6 a. m. showing slight pain, rolled twice, once on his back, pulse, respiration and temperature increased. Gave an enema; a small amount of feces was passed. At 8 a. m. he was very much worse, membranes very yellow, and pain increased. He died at 9 a. m.

I diagnosed the case before autopsy as one of jaundice.

The autopsy revealed the liver enlarged, weighed thirteen pounds. All other organs normal. Carcass yellow, looked more like a jersey calf than a colt.

This weanling was never sick a day in his life until the day he was taken ill.

The one peculiar thing about this weanling is that this is the second foal of the dam. Last year the first weanling died, showing the same symptoms that this colt showed, but was treated by another veterinarian who made no autopsy.

JAS. T. SHANNON.

Lexington, Ky.

A SUCCESSFUL OPERATION FOR SELF-SUCKING

In reply to "A. S." of Minnesota, who asks in the September issue for some method to stop a cow from sucking herself. The following operation for the cure of this vice is a very simple one, and in my experience always successful.

The operation consists of the amputation of a section of the tongue, and was I believe, first introduced by Dr. S. L. Stewart Instructor of Anatomy in the Kansas City Veterinary College. I have performed the operation several times; it is one of the few things in medicine or surgery that I feel is a reasonably "sure thing."

In operating, I first cast my cow and "hog tie" her. I have an assistant sit on the upper part of the head and hold it quiet. Holding the mouth open with a speculum, I withdraw the tongue and wrap a rubber tourniquet well up around the base of the tongue, allowing the assistant to hold the end, which keeps the tongue protruded so that I can work easily, taking care of course to be as gentle as possible. I then amputate about two and a half inches of one side of the end of the tongue, making the first

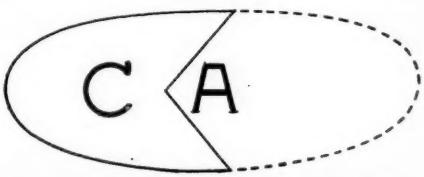


Fig. 1. Cross section of cow's tongue showing the line of incision for Stewart operation for self-suckers. A. Portion of the tongue removed. C. Remaining portion.

incision along the median raphe, from above to the center and inward, and then from below and inward, so that the stub is left thus: (See Fig. 1). To be brought together when sutured, allowing a continuous mucous membrane.

In suturing, I use a catgut suture, after which I pour a small amount of Monsell's solution on the wound before removing the tourniquet. No after treatment is necessary, although I prescribe a bran mash mixed with milk for the first day's feed.

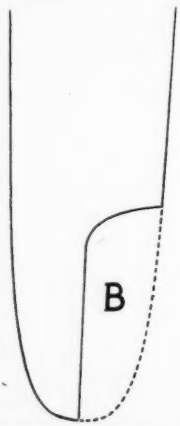


Fig. 2. Cow's tongue after the Stewart operation
B. Portion removed

The cow will show no outward signs of the operation after the first three days, the perfect drainage and the constant washing with saliva assisting healing in a remarkably short space of time.

When healed the tongue appears as shown in Fig. 2.

CLIFF ASHLEY, D. V. M.
Castle Rock, Wash.

OBSTETRIC PROBLEMS

Referring to that portion of Doctor Martin's article (page 477, November issue) relating to the unexpected or unexplained cause of death following comparatively easy labor, where the fetus is expelled dead, and in which case he attributes to the death of the dam to the kicking of the fetus in its death struggles *in utero*. In my opinion this explanation of the cause of death has no foundation, from a theoretical viewpoint, as it is difficult to imagine sufficient room for the fetus *in utero* to exert such violent muscular contractions and drive a blow severe enough to produce death, or even to be a contributory cause of death.

That the struggles of a fetus in utero are stronger than is generally attributed to them, many of us know; that a fetus may bruise the mucous coat to a certain degree, in these struggles, all will admit; but that they are not sufficiently forceful to produce death, few will agree.

In practice I have never seen a case where I could attribute the rather unexpected death, following labor, to this cause and while my obstetrical practice has been more limited than many, I have seen numerous cases in which death followed violent contractions of the uterus, and in other cases where I could hardly explain why death followed unless shock was responsible for it.

There is, in my opinion, altogether too much neglect or carelessness indulged in by veterinarians as a rule, in connection with obstetrics. It may seem like an insult to many veterinarians to tell them they are responsible for the death of the animal, in some obstetric cases at least, but I am forced to believe this to be a fact.

The deaths following very soon after comparatively easy labor have many times been difficult for me to explain, but that numerous deaths, following in a few days are often caused by avoidable infection.

I believe veterinarains as a rule are too free to enter the uterine cavity without thoroughly disinfecting their hands, instruments, and pumps and the external genitalia of the animals.

In my opinion it is a very wise procedure or rule to follow, never to enter the uterus unless it is positively indicated, and then only after thorough disinfection of all instruments, hands, etc. A rubber hose, or pump carried from one case of parturition or retained placenta to another, unless thoroughly disinfected by boiling or steaming, is a most ideal carrier of infection, and yet to this day there are veterinarians guilty of this very act. In this connection I desire to call attention to a very common and foolish custom in removing the placenta in cows. It is not an uncommon occurrence for some veterinarians to remove only such

parts of the placenta as can be torn loose after inserting the arm. Instead of such crude methods the operator should use his fingers in gently working the placenta loose from each separate cotyledon, which are the only attachments it has, and follow with copious warm, weak, antiseptic solutions made from sterile water, to disinfect and contract the uterus.

If the placenta can not be totally removed in this manner the operation should be postponed and in the interim flush the uterus twice daily with chinosol or lysol solutions until such time as the above complete removal can be accomplished, if in the meantime the placenta does not release itself, which it very often does.

D. I. SKIDMORE.

Dayton, O.

IS THEORETICAL HORSESHOEING SUFFICIENT?

It is so seldom that we have the privilege of reading anything pertaining to horseshoeing in our veterinary periodicals, that I was much interested in an article that appeared in the March issue of the journal, entitled "Prevention and Treatment of Corns," by L. A. Greiner of Terre Haute College, and I want to say that I think it worthy of commendation.

After reading the article, I began to wonder how many young veterinarians there are who can take a horse's foot between their knees, remove the shoe, and explore the foot in a scientific manner.

It is embarrassing to the profession to see a young practitioner awkwardly trying to perform some simple operation on the foot, one for which he has had no specific training.

Having had a large experience at the forge myself, and being a close observer, I believe that the young veterinarian, on leaving college demonstrates a lack of practical knowledge in shoeing.

I can think of no other branch of veterinary surgery that is so slighted in our veterinary colleges as that branch which deals with horseshoeing.

While it is true that the students do get a course in shoeing, and one which is very commendable and valuable as far as it goes, this, I believe, is not sufficient. To my mind the importance of a thorough knowledge of the horse's foot, in health and disease, can hardly be overestimated.

When we remember that a large part of the work of a veterinarian (especially in the case of a city practitioner) is the treatment of lameness, the major part of which is that pertaining to the foot, and which is most frequently caused by the shoe, I can see no reason why the student in school should be given so little practical work.

I can think of no other part of the horse's anatomy that is so much exposed to accidents and pathological conditions as the foot, therefore, it follows that it requires more manipulations, for all of which a practical knowledge is necessary. Furthermore, there is but one person who should attempt to diagnose or prescribe in cases of lameness, and that one person is the qualified veterinarian and not the horseshoer.

While it is not my purpose to cast any reflections on the integrity of the shoer, I will say that there are many conditions and symptoms which can be covered up, and may be overlooked, if the lameness is due to his carelessness, and if he is called upon to make a diagnosis, as is too often the case.

While I maintain that a student should get more practical work in college, I do not infer that he should be taught to shoe horses, but I do insist that he should know what kind of a shoe is best adapted for certain conditions and when it is properly applied. He should know when a foot is balanced and how to do it. He should be competent to pare a foot properly. He should be able to examine a foot, i. e., to explore it with ease to himself, and with as little inconvenience and pain to the patient as possible, and the only proper way to do this is to be able to take the foot between his knees and use the knife, or rasp, or other instruments that may be necessary. (I refer to minor operations.) This knowledge cannot be acquired entirely from charts, models, drawings, or lectures. While classroom work is absolutely indispensable in my opinion, no one will deny that it, alone, is not sufficient.

To obtain a thorough knowledge of

anatomy or pathology without having access to the dissecting room or laboratory would be impossible. Therefore, to become proficient in the art of farriery one must depend largely on laboratory exercises.

In conclusion, I would say that I do not want to be misunderstood, as I am not writing this in a spirit of criticism, but with more of a feeling of regret. And though I have no solution to offer, I hope the time will soon come when the young man will be better equipped in this particular branch of veterinary surgery and that practical farriery will have a very prominent place in the curriculum of every veterinary college.

W. H. REDHEAD, V. S.

Cleveland, O.

EVERTED BLADDER MISTAKEN FOR TUMOR

I was informed by the owner that a 1500-pound black mare, four years old, had given birth to foal in the normal manner, but that two days later a pear-shaped organ was noted protruding from the vulva. A neighboring veterinarian was called and pronounced it a tumor and advised hot antiseptic treatment three hours daily. After three weeks' treatment with no improvement in appearance or diminution in size of the tumor the owner again called the veterinarian but he refused to answer the call. Three months later I was called and gave the mare a thorough examination. A rather large pear-shaped organ, five inches in thickness and eight or nine inches long, rough and fibrous in texture and dark hemorrhagic in appearance was protruding from the vulva. Two small openings were noted in upper part through which a cloudy fluid was seen to pass at variable intervals. The apex was somewhat necrotic. Examination of vagina showed it to be ballooned and os uteri deviated to left. I pronounced so-called tumor the bladder, and to convince the owner of the true nature of the tumorous-like enlargement I called Dr. T. O. Brandenburg in consultation and he readily diagnosed the case as one of eversion of bladder. As replacement was impossibel owing to thickened and indurated walls, we informed the owner that operation was necessary.

The mare was given ten drams of chloral. One hour later an elastic ligature was applied below the urethral openings, the free end of the bladder was then excised a short distance below the ligature and a silk suture was applied at right angles to the rubber ligature to prevent upward or downward movement.

Although prepared for shock it came with unexpected severity. A hypodermic of morphine was administered and in four hours' time mare regained her feet and was eating.

I visited the patient the following day and found her doing nicely, temperature 101° F., pulse fifty. Prescribed medicines to render urine bland, also antiseptics for irrigation and instructed owner as to their administration.

On September 8th, called on owner who lived seven miles from city and found mare fully recovered, stump of bladder entirely out of sight on floor of vagina, urine being ejected from vagina in about half-pint quantities.

The owner informed me on November 18th that the mare had entirely recovered and was being worked daily.

ROBERT L. BRODERICK, V. S.

Michigan, N. D.

INFECTIVITY OF RABIES

At a meeting of the Hungarian physicians and natural historians at Budapest, the question of a time limit with regard to infection from rabies was discussed by Dr. Konradi, who described his efforts to discover how long the body of a dog which has died of hydrophobia remains infective. Having been called into court to pronounce judgment on a dog buried three months previously, he found that no experiments had ever been made for the purpose of settling once and for all how long the infection lasts in such cases. He was obliged, therefore, to bury for a certain period the bodies of dogs and rabbits which had died of rabies, and from them perform, at stated intervals, intra-muscular and intra-arachnoidal inoculations on other

animals. By these means he was able to prove to the satisfaction of the court that in this instance the earth does not act as a disinfectant, and that even at the end of three months the body of the dead animal is only a little less infective than the very day it was buried.

—*The Veterinary Record.*

NASAL POLYPUS REMOVED

I recently performed an unusual surgical operation which I believe may interest the profession.

A bay, 1600-pound horse twelve years old was brought to me for treatment. Examination showed an angry looking tumor, cauliflower shape, projecting from andentirely filling the right nostril so that all respiration was through the opposite one. A very fetid muco-purulent discharge continually dribbling from affected side. By means of a sound, the tumor was found to turn inward and upward on the floor of the nasal cavity.

Operation was decided upon and I called in Dr. T. O. Brandenburg to assist me. The animal was suitably secured in lateral recumbency after preparing the field of operation. We trephined through the proximal part of the right nasal bone into the upper part of the nasal cavity. The attachment of the tumor was then searched for and was found to be attached to quite a small area of the perpendicular plate and adjoining cells of the ethmoid. Due to the small attachment of the tumor we decided to attempt removal by traction. An ecraseur was applied as far up as possible and by gentle traction and a twisting movement it was removed with part of perpendicular plate of ethmoid. Examination through trephined opening showed that it was entirely removed. The hemorrhage, which was very profuse, was checked by suitable tampons saturated in monsells solution. Histologic examination revealed tumor to be a myxo-fibroma. It measured fourteen inches.

The horse was discharged after two weeks' treatment with antiseptic washes and is now at work.

ROBERT L. BRODERICK, V. S.
Michigan, N. D.

A TRIBUTE TO A GREAT SCIENTIST

There died at Sharon, Massachusetts, October 14, 1912, a man who only a few years ago startled the world by the announcement that he had discovered the germs of that much dreaded disease called swine plague.

Dr. Frank Seaver Billings was born January 15, 1845, in Boston, Mass. At the age of twelve he entered the Allen school in West Newton, Mass., where he studied five years. Because it was feared that he had inherited tuberculosis, his father sent him to sea in one of his vessels of which he owned a number. He followed the sea for eight years but in 1870 went west to Michigan and worked on a stock farm, where he remained three years, afterwards going back to his home in Boston. On November 6, 1873, he married Harriett Matilda Roulstone. A little son, George Seaver, was born October 7, 1874. In the summer of 1875 he entered the Royal Veterinary Institute of Berlin, from which institution he took his degree. It was his good fortune at this time to study pathology under the late Professor Virchow. While in Berlin he met with a great sorrow in the loss of his little son, who died of scarlet fever and diphtheria, January 4, 1879. After his child's death, Doctor and Mrs. Billings returned to Boston. On October 20, 1881, they were blessed by the birth of a daughter, Frieda G. Doctor Billings practiced his profession in Roxbury, Mass., until 1883, when he again went to Germany to study bacteriology under Koch.

Doctor Billings returned to America in 1885 and took a position in the New York Polyclinic. On the 12th of December of that same year he sailed again for Europe for the purpose of placing four boys who had been bitten by mad dogs in the Pasteur Institute for treatment. The results of this trip were very successful. While at the Polyclinic in New York he received a call from the State of Nebraska and he entered the service of that state as pathologist and bacteriologist at the University of Lincoln. In 1888 he went to Chicago and engaged in business, with Mr. George Seaverus, for the manufacture of a virus which Doctor Billings had discov-

ered for the prevention of hog cholera. Owing to the opposition of government officials, however, the venture was not a success. In 1890 he went back to Nebraska where he remained until 1893, when he resigned his position and returned to the East. Making his home first in Grafton, and later in Sharon, both towns of his native state, he continued his scientific studies and research until his death. During his residence in Grafton, in 1895, he was the means of saving many thousands of dollars to the farmers of Massachusetts by his expert testimony on the question of tuberculosis in cattle.

The following words are a part of the tribute paid him by one writing to a local newspaper at the time of his death: "In Germany he had taken special work under the great pathologist Rudolph Virchow, and was eminently fitted for the work in Nebraska to which he was called and there he is credited to have been one of the first to get on the track of the antitoxin method of treating germ diseases which has since become so popular and so successful. He did much good work for the state in the study of animal diseases and several valuable books were published by the University from his hand. . . . .

"The most of us want some credit for the good we try to do in this world, and when we are misunderstood and our motives maligned we are apt to be somewhat discouraged and embittered. Doctor Billings was no exception to the rule. He would have been more than human if he had been. . . . .

"He still continued his studies, reading omnivorously all the new books on biology and the kindred sciences, and I wish to bear witness that it was a great privilege to be admitted to the treasures of his mind."

Doctor Billings had received many honors. In addition to receiving his degree from the Royal Veterinary College of Berlin, he was a member of the Royal Veterinary Association of the Province of Brandenburg; honorary member of the Veterinary Society of Montreal, Canada; member of the American Medical Association; member of the Gynecological Society of Boston; honorary member of the Alumni Association of the Medico-Chirurgical College of Philadelphia; member of the Chicago Academy of Medicine and lecturer before the Chicago Veterinary College.

Doctor Billings was a man of tremendous energy, with a mind that sought truth for truth's sake. He was careful in his statements and never expressed an opinion on any scientific subject without having first considered it from every viewpoint. His writings were always based upon careful and original research. He did splendid work among the herds of cattle in Nebraska and taught the farmers how to protect their cattle from contagious diseases. His preliminary labors in conquering the swine plague were extensive, covering a broad field, and have been used by his successors with good results. These researches have been modified by later experiments until at the present time the inoculation treatment has been used by western swine-breeders without fear. The views first promulgated by Doctor Billings have been introduced as a stepping-stone in the treatment of nearly all animal diseases so far discovered.

As a lecturer, Doctor Billings was positive, basing his ideas upon his researches, thus giving all his addresses weight and interest. Many teachers are able to impress the thoughts which they have learned from their teachers or their books, but the teacher who can give from his own experience, observation and research, is able to go further in the advancement of knowledge among his pupils. Such as the latter was the subject of our writing and to his careful preparation for this phase of his life work as a scientist, we are happy to bear tribute. The same general impression is ours in regard to his writings, of which there were several books and pamphlets and one unpublished manuscript for a book on religion bearing the title "Gospel of Might." Perhaps he was best known as an author by his book entitled, "Investigations on Swine Plague," a most helpful and practical work for scientists, students, farmers and stock breeders. He was a close student of sociology, and wrote a book, giving a most interesting discussion upon one phase of the subject. This work bore the title "How Shall the Rich Escape?"

He was a regular contributor to medical journals and to many stock magazines, and the editors and subscribers of these had many favorable comments to make upon his contributions.

During his later years many were able to visit him in his home and to learn something of his great personality. Those who were his friends bear testimony to the high and noble character which was his and the ideal life he led as husband and father.

A character like his is not to be forgotten. His discoveries and works remain with us and are monuments to mark the progress of a faithful student, a great scientist and an American citizen.

EUGENE S. TALBOT.

Chicago, Ill.

LIST OF ACCREDITED VETERINARY COLLEGES*

Revision of list contained in Regulation XXIV, Bureau of Animal Industry Circular 150, "Regulations Governing Entrance to the Veterinary Inspector Examinations."

The following list of accredited veterinary colleges, graduates of which are eligible for the civil-service examination for the position of veterinary inspector in the United States Department of Agriculture, Bureau of Animal Industry, is hereby approved in lieu of that published in Regulation XXIV of Bureau of Animal Industry Circular 150, "Regulations Governing Entrance to the Veterinary Inspector Examination," and in lieu of the revised list published in Bureau of Animal Industry Circular 150-A:[1]

Alabama Polytechnic Institute, College of Veterinary Medicine.
Chicago Veterinary College.
Cincinnati Veterinary College.
Colorado State College, Division of Veterinary Medicine.
George Washington University, College of Veterinary Medicine.
Grand Rapids Veterinary College.[2]
Indiana Veterinary College.
Iowa State College, Division of Veterinary Medicine.
Kansas City Veterinary College.
Kansas State Agricultural College, Veterinary Department.
McKillip Veterinary College.
New York-American Veterinary College.
New York State Veterinary College.
Ohio State University, College of Veterinary Medicine.
St. Joseph Veterinary College.[3]
San Francisco Veterinary College.
State College of Washington, Veterinary Department.
Terre Haute Veterinary College.
United States College of Veterinary Surgeons.[4]
University of Pennsylvania, School of Veterinary Medicine.
University of Toronto, Ontario Veterinary College, to include only those graduated during or prior to 1897.

Graduates of the following-named colleges which are not now in session will be admitted to examinations:

Columbian University, Veterinary School, Washington, D. C.
Harvard University, School of Veterinary Medicine, Boston, Mass.
McGill University, Veterinary Department, Montreal, Canada.
National Veterinary College, Washington, D. C.

Graduates of the following-named foreign colleges will be admitted to examinations:

Glasgow Veterinary College, Glasgow, Scotland.
Royal Veterinary College, London, Eng.
Royal Veterinary College of Ireland, Dublin, Ireland.
Royal (Dick) Veterinary College, Edinburgh, Scotland.
The New Veterinary College, Liverpool, England.
Veterinary College of Lemberg, Austria.
University of Melbourne, Veterinary School, Melbourne, Australia.

*Bureau of Animal Industry Circular 150-B.

[1]This list is subject to change. The failure of any college to comply with the provisions of the regulations will necessitate removal from the list.

[2]To include only those graduates who have pursued the study of veterinary medicine at this college or in some other accredited college for three years.

[3]Matriculates of 1910, in addition to the regular course, will be required to take one year's additional instruction at this college. Graduates prior to 1914 will be required to have had one year's practice and to take an additional year's instruction at this college.

[4]Graduates of 1910 and 1911 will be required to present a certificate showing attendance for an additional session at thi or some other accredited veterinary college.

Nan

By GORDON G. BURDICK, M. D., Chicago, Illinois

I had now had Nan under my treatment for seven months, and I had watched her progress toward health with considerable satisfaction. She had gained considerable in weight, her blood was normal, while the bones began to harden from the lime water she was given with each meal. Even now she bid fair to have unusual beauty but the condition of her back and legs bothered me greatly and I began to realize that I must be up and doing if I succeeded in restoring the parts to normal, so she was suspended by the head and a plaster jacket was fitted to partially strengthen her back. I had husbanded the money I got from Madame Mindo with great care, hoping to have enough to give her at least a common school education and I was reluctant to buy her braces for her legs at the high prices asked for this apparatus. By the use of considerable persuasion I prevailed upon "Big Jerry," the blacksmith, to forge the apparatus out for me, but after several trials I found it impossible to make my ideas intelligent to his simple mind, and becoming disgusted I threw off my coat, and, grabbing the iron and hammer, began to shape the steel as I saw it in my mind, much to the amusement of the good-hearted fellow and his contingent of idle teamsters, who were waiting for their horses to be shod. I was surprisingly successful, and after I had it shaped to suit me, my big friend kindly put the finishing touches on it.

The apparatus restricted the freedom of motion of our patient, but the skin was so intolerant that she could wear them for but a short time without causing abrasions, and considerable experimenting was done to avoid this and at the same time allow the girl a certain amount of freedom. Nan, while we had succeeded in convincing her of the necessity of wearing them, still believed them the invention of the devil, an opinion, by the way, that I was reluctantly compelled to agree with before we were done with them. It soon became apparent to me that to restrict freedom of motion with the girl meant death, as she failed rapidly in health until I associated the cause of the trouble with the braces and discarded them while racking my brains for something to take their place. She began to mend as soon as she was allowed to run around and play and it was while watching her one afternoon in the back yard climbing trees and romping around with Bob that the logical of truth of physiological therapy sunk into my head. I reasoned that here we have a girl in fair health with very soft bones and one who was by nature, agile; why not take advantage of this fact and use it for her good. If she could not wear braces she could hang head downwards by her toes and could by this means oppose the weight of her body against the undesirable curve in her limbs. I also reasoned, why not teach her to suspend herself by the head and oppose the weight of the body against the spinal deformity.

It appeared a very radical procedure and one in which I could find no authority to justify me, yet after sleeping over the question for several nights its feasibility seemed plain. I started her off in a mild manner with general calisthenics, gradually evolving the positions I mostly desired, and by systematic exercise strengthened the muscles that were weak, and by allowing her to lie on her back I could catch her by the feet, and in a few weeks she had progressed so that she was perfectly comfortable hanging by her toes from the pair of gymnasium rings I had gotten for her. She became so used to the position that she could hold it for fifteen minutes without discomfort and we named the exercise the "siesta," which in her case meant that she was in one position where we could find her without trouble, a condition that rarely happened, as she had a well developed curiosity and a penchant for visiting old people without notice and working them for a story. This tendency of hers to wander caused Aunt Mary much distress and she had about the same anxiety as a Brahma hen who has lost one of her brood. I took it as a mere matter of course, when I was sent for to go to Aunt Mary's. She sent for me not only in sickness but to look for Nan when she could not be found. And Auntie said she always did admire the beautiful way I could throw a tramp over the fence, and I believe she used to make a business of bully-ragging them so as to give me the opportunity to be useful to the household. Anyway, this became one of my standard calls several times a week.

I had succeeded in getting Nan instructed in her A. B. C s and when I had a spare hour it gave me great pleasure to teach her the mysteries of English spelling, and she was a mighty proud girl when she could remember how to spell "rat" and "cat" over night, and for fear she would forget she was very likely to stop a pedestrian on the street and try it on him or her so as to keep her memory refreshed.

The child had a simple mind; no one had ever attempted to develop its latent possibilities and it gave one a creepy feeling to be approached by a girl old enough to know better and to be gravely informed that she could spell "cat."

Aunt Mary Is Pinched

Time had slipped away so quietly since our midnight raid on Madame Mindo's place that I had scarcely noticed that eight months had gone by. Aunt Mary still had the girls with her, and while Blanche had been content to take all the cares of the household for $3.50 a week, and the pleasure of Aunty's society, the other two girls had tried their hands at various occupations as waitresses, maids, etc., and without any special marked success, still Aunt Mary was hopeful and allowed them to occupy a hall bedroom and saw to it that they were not hungry. I had gone on with my regular work in the usual monotonous way of physicians and had fallen into the habit of calling at Aunt Mary's house several times a week after my day's work was done, to visit, look after my patient's physical well-being and direct her in the physical culture so necessary for her full development, and as we began to make progress, ultimate success seemed certain.

I began on the task of giving her the foundation of an education that I hoped would be liberal in its scope. Nan was remarkably bright, had a good memory and we made rapid progress towards placing her on a plane where she could associate with others of her kind, without humiliation. We had become so absorbed in this task that we scarcely noticed the rest of the household and they,

recognizing the importance of our effort, refrained from disturbing us while at study.

My practice had steadily increased and was becoming more remunerative as time passed. I had gradually established a black list by the simple process of getting "stung" by every dead beat in the community, until I gradually learned who they were and was enabled thereby to turn an immense practice over to other young medical men who had located in my vicinity trying to get a generous slice of the prosperity I had enjoyed. A few survived and made good by delivering papers in the morning or lighting street lights at night. The majority faded away like the promises of constancy of the absent lover.

This, I believe, is a good method of making physicians, it teaches them some of the good and bad traits of humanity and prevents them from buying gold bricks later in life. These people unconsciously pay the doctor not in the good hard coin of the realm, but they furnish him with an opportunity of turning the theoretical knowledge of the class room into the practical knowledge of experience. It is while treating this class of people that he is enabled to try out and forget at least ninety per cent of the drivel that is taught him in the average medical college. It fits him eminently to forage on the country; he soon learns the location and staying qualities of all the free lunch routes in his vicinity; it gives him nerve when he learns how to tell an interesting story so as to hyonotize the bartender so that he does not see that the lunch is disappearing while the story is being told. It is important that all stories have a climax so as to double up the auditors thereby allowing him to slip a generous sized sandwich into his pocket for future references.

This being accomplished it only remains necessary for him to learn how to fold his only pair of trousers under the mattress at night so they will be properly creased while he is taking his needed rest, and he will be in a fair way to succeed in medicine in a large city. I had passed through this evolutionary stage and had become so opulent with wealth that I had become a patron of the immortal Bell and had installed one of his labor-saving appliances in my bedroom. I do not know whether I held my head any higher or not, but I was immensely pleased to see that I was one of the very few physicians who had the necessary $125.00 to get my name in the directory. I do not know who was the most pleased, my patients or myself; certainly, I frequently heard them tell their friends with considerable pride, "that my doctor even has a telephone in his house."

I had the instrument installed for one week and it had gotten so I could carry the honor thrust upon me with a certain degree of nonchalance when I was awakened one night by the violent ringing of the bell.

Upon taking down the receiver a voice inquired, "Say, is this you, Doc?"

"Sure," I said.

"Well, your friend is pulled."

"Eh, what?"

"Yes, your friend is pinched."

"Which friend?" I asked, running over in my mind quickly a great number of ne'er-do-wells who had depended upon me to see the aldermen to get them out of trouble.

"It's the old girl." said the voice.

"Say, who the devil are you?" I ecxlaimed savagely.

"Why, it's Humpy, de newsy."

"Well, Humpy, please tell me just who is pinched and where they are held."

"It is your friend at No. —Steenth Ave. Dey pulled the house, they're all down to Barrison Street Station."

"All right, Humpy, I will attend to it," I said, although I was anxious to get to the door as someone was trying to pull the door bell out by the roots.

"Well," I said to the excited individual who was industriously pulling the bell, "what's up?"

"Say, Doc, your friend is pinched."

"Who do you mean?"

"Why, Aunt Mary on Steenth Avenue."

"What for?" I asked, just now beginning to appreciate the gravity of the situation and getting an inkling of the motives behind the action.

"She was running a 'fence' and the 'bulls' (plain clothes officers got a wagon load of loot in de house."

"All right, Sam, I will go right down and attend to the matter."

I began to dress hurriedly, wondering how the police dared to interfere with a woman of Aunt Mary's connections and the more I thought about the matter the more savage I became. It is curious how the human mind will revert to its savage ancestors when one of our own happens to be in the toils of the law and we believe them to be the subject of injustice, and I made a mental vow to get the jobs of the men who were guilty of the atrocious blunder, so that by the time I got started my temper was so red hot that several well meaning jokers got burned by some of the sparks, and when I sailed into the station I was hot enough to burn it, down. Fortunately I met a friendly officer who explained the matter to me.

EIMER & AMEND

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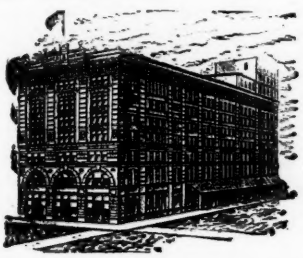

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It seemed one of the store detectives had observed Mame secrete some goods in her sleeve, and believing she was an old offender had not arrested her, but had followed her to Aunt Mary's house and swore out several warrants for the inmates, and to search the house; a green wagon man had made the raid and took everyone present together with several hundred dollars' worth of stolen goods found secreted in different places, and while the thing became clear to me I realized its seriousness owing to the fact that the offense was a state charge and not subject to the ordinary pulls that were worked in the police court.

The first thing was, of course, to procure bail, something that is not easy at 2 a. m., and the only man I could think of was Dutch Bob, a saloonkeeper with a pull who boasted that he had lost the key to his front door. For some unknown reason this gentleman was the only man who could keep his saloon open after 1 a. m. in three blocks. He weighed about 320 pounds and for this reason was probably so small, that the average policeman could never see him.

So I headed in his direction and, as I expected, found him behind his hospitable bar, and told him my troubles. His kindly German face showed considerable sympathy and he agreed to go my bonds and directed me to a brothel in the near vicinity where I was told I would find a judge. I found him all right, but so drunk and ugly that no persuasion of mine would make him leave the place, and after trying bribes, coaxing and later threats, I was compelled to go back to Dutchy with the story of my failure.

"So, so, he won't come, ain't it? You go back and tell him to come quick, py my place, py tam."

"He is drunk, Bob, and ugly, and I don't think he will come."

"He come already quick, you go." said Bob with an ugly look. So I went back to interview the judge and you can bet the message lost no vigor in my telling it to him.

It was clear that I had struck a responsive chord in the judge's mind as he called for his hat and accompanied me to Bob's place, and when he got there the worthy Dutchman literally and figuratively climbed the judge's neck, and he was given a long dissertation in half English and Dutch on the ethics of not responding to a humanity call when he was needed, and he was warned that his job depended upon his being on duty when wanted or he would be transferred out among the jack rabbits to ruminate on the error of his ways.

After the judge had been reduced to the proper frame of mind, we adjourned from the saloon to the police station where the defendants were released on nominal bail and after thanking Bob, I took the papers to the desk sergeant and obtained an order on the matron to release my friends from custody.

NOTE

In the simple story of Nan I expect not only to interest my readers but shall give them a view of a social cancer. I shall explain many strange things and take my readers through the underground tunnels of our courts. Money, organizations, and brains, are at work trying to debauch the youth of the land. Many forces are organized trying to remedy the evil, yet they are seriously handicapped because their agents have not the necessary facts to work with. Fore-armed with knowledge alone will protect our young.

I have no sympathy with the evil system and despise a "sport" be they male or female. The

Anti-Influenza Vaccine

The original **Beebe Anti-Influenza Vaccine,** of superior efficiency, has been paid the highest compliment by its several imitations now on the market.

It has proven it merits in the prevention and cure of Influenza, Strangles and Shipping Fever—for which it is The Ideal Preparation.

Its success with others justifies your confidence.

W. C. SPRINKLE, Veterinarian

Oaktown, Ind. Dec. 19, 1912.

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Gentlemen:
I take pleasure in saying I am very much pleased with the results obtained from Beebe Veterinary Anti-Influenza Vaccine.
I recommend it to my friends and patrons.
W. C. SPRINKLE, D. V. M. S.

ST. PAUL UNION STOCK YARDS CO.

South St. Paul, Minn., Feb. 26, 1912.

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Gentlemen:
We would like to say in regard to your Anti-Influenza Vaccine that last fall our Veterinarian injected our horses with it. Since the injection not a horse has developed any signs of influenza. At that time this disease was very prevalent in this locality. One of our horses was recovering from a severe attack of influenza when others were treated. We feel that this was a good test of the reliability of this vaccine.
Very truly yours,
ST. PAUL UNION STOCK YARDS CO.
By Jas. Reid, Superintendent.

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Recommended for use only by the Veterinary Profession.

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FOR SALE—HALF INTEREST IN BEST HOSPITAL in Texas. Town of 3000. Good roads; fine climate. Have more than I can do. Thirty-five miles to nearest graduate. If interested write Dr. C. W. Reagin, Lockhart, Texas. Graduate, K. C. V. C., 1911.

AIREDALE TERRIERS—THE CLASSIEST DOGS for veterinarians. Special prices to the profession. Subject to registration. Write me if you want a good one. J. E. Nance, D. V. S., Anadarko, Oklahoma.

FOR SALE—AN OLD-ESTABLISHED VETERINARY practice in Massachusetts, within three miles of State House. Good reason for selling. Address No. 79, care of VETERINARY MEDICINE.

WANTED—A POSITION WITH AN ESTABLISHED veterinarian by a 1912 graduate. Have had previous experience. References furnished if desired. Address No. 80, care of VETERINARY MEDICINE.

$1750.00, BEFORE FEBRUARY 5, 1913, WILL buy a lot and a half with good six-roomed residence, well located; also office fixtures, drugs, rigs, and a good five-year-old driving horse, weight 1100 lbs., along with practice amounting from $1800 to $2000 yearly, and increasing each year. Located in town of 1200 in Northwestern Ohio. Address No. 81, care of VETERINARY MEDICINE.

WANTED—POSITION AS ASSISTANT, BY AN UNder-graduate (Junior). Had some experience. References. Can report at once. Address No. 82, care of VETERINARY MEDICINE.

FOR SALE—AT A BARGAIN IF TAKEN AT ONCE. Veterinary practice in a prosperous county seat of 3000, in the Platte Valley, Central Nebraska. A great live-stock center, surrounded by splendid corn and alfalfa farms. Average practice per year for four years $5800.00. Price $500.00. These statements are accurate and must be proven to your satisfaction. Don't write unless you mean business. Address No. 83, care of VETERINARY MEDICINE.

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people do not realize that many unfit men are administering so-called justice in our courts, and that our whole system of government is influenced by the wretched people who live in the underworld. It is a plain statement of facts by a young, unsophisticated doctor who found himself among them for a few years and did the best he knew how with conditions as he found them.

Our cities need the help of the country to make just laws to govern them. It is only through their help that political organizations can be taken from the Boss, and placed in the hands of the people. The great political parties in our cities are controlled by the same clique of men, and the people have little or nothing to say about the results. It's a case of heads I win, tails you lose.

THE TRIAL

When I had procured bail I went up to the Annex to secure the release of my proteges. My voice was immediately recognized when I applied for admission and I had to contend with another attack of hysterics from the whole family. Nan reached me first and hung around my neck until I was afraid she would choke me, while Aunt Mary was skirmishing around looking for an opening to fall on my chest and weep. I eventually got them together and headed for home, they being secure in the belief that I had succeeded by some "hocus pocus" in getting them out of the hole. I was sorry to undeceive them but eventually they began to understand that they would have only a few days' respite and that the case looked black from any direction. A little investigation showed that Mame alone was involved. She had succumbed to the temptation of taking many of the pretty things so lavishly displayed upon the counters of the stores, and while she did not dare wear them while at Aunt Mary's house, owing to the fear of discovery, still she had gotten some satisfaction in dressing herself in the finery and admiring her beautiful form behind the closed door of her own room.

(To be continued.)

ARMY VETERINARY BILL ON THE "UNANIMOUS CONSENT" LIST

(Concluded from page 60)

decided when Congress convenes after the holiday recess to risk all, in the House, on its fate on the "Unanimous Consent" calendar. Here the opposition of a single member will prevent the passage of the bill but so thorough has been the work for this bill that it seems that even this may be avoided.

It is expected the bill will be reached by the Senate without asking for its consideration under unanimous consent.

FOR SHOULDER ATROPHY

Argentum nitras.....dr. 1
Distilled water.....oz. 6

Apply as needed.

I have had good results from the use of the above.

Have had three cases of pneumonia, following use of arecoline in choke. They had all been drenched before I was called.

F. E. JONES, M. D. V.

Rochelle, Ill.

VETERINARY CONFERENCE AT PARDUE

A conference of Indiana veterinarians and Agricultural Experiment Station officials was held at Pardue University December 19th, 1912. The purpose of the conference was the discussion of hog cholera and means for its control.

ANSWERS WANTED

Here are a couple of questions for the question box, which I would like to have answered:

Treatment for a horse that scoures on the road and a bad one at that.

Also treatment for a horse with belching colic (as I term it), without use of the stomach tube.

V. S.

I note in the October number of VETERINARY MEDICINE (page 468, second column) that a party would like to know the formula of "Save the Horse." Here is a formula I believe to be substantially the same:

Oil absinthium or wormwood oz. 1
Spermaceti.....oz. 1
Oil of cedar.....dr. 4
Oil of origanum.....dr. 4

Sig. Apply four days, then rest four days and repeat.

N. RECTENWALD.

Pittsburg, Pa.

OHIO VALLEY VETERINARY MEETING

The Ohio Valley Veterinary Association will hold its annual meeting at the Terre Haute Veterinary College, Terre Haute, Indiana, February 5th and 6th, 1913.

The afternoon of the 5th will be devoted to reading and discussing papers, and the evening to a stereoptican lecture. Clinics will occupy the second day of the meeting.

An unusually good program is being prepared and large attendance is desired.

DR. T. C. HOWARD,
Sullivan, Ind. *Sec'y.*

VETERINARY PROPRIETARY REMEDIES ANALYZED

The Pure Food and Drug Department of Kentucky, of which Dr. Robert Graham, state veterinarian, is a member, has decided to make an analysis of proprietary veterinary remedies on the market in Kentucky.

This is a very laudable undertaking and doubtless in revealing the frauds that many proprietary remedies are either in ingredi-

POLY-BACTERINS

This is conceded to be the most useful therapeutic agent given to the veterinarian in many years. Its action is specific. It is the basis of a successful hypodermic treatment for strangles, shipping fever, influenza and navel-infection; also for fistula, poll-evil, nail puncture, calk-wounds, quittor, wire-cuts and suppurative conditions generally.

Poly-Bacterins contain killed staphylococci, streptococci and colon bacilli. One (or all) of this group is responsible for 95% of the cases of suppuration in the horse.

The unparalleled success of this agent in the various pus cases, and the wonderful popularity of this product, has led to a flooding of the market with bacterins from divers sources; nevertheless the use of Poly-Bacterins (Abbott) has increased from the first month it was placed on the market and its superiority over others is not questioned by users.

Poly-Bacterins constitute the most effective and at the same time the least expensive treatment a veterinarian can use in the prevention and treatment of suppuration—an exceedingly wide field of usefulness. It is a working-tool you cannot afford to overlook.

Order in quantities and take advantage of the discounts.

PRICE

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ents or price or both will supply the farmers of the state with information that will mean a great saving to them.

KANSAS VETERINARIANS TAKE NOTICE

The ninth annual meeting of the Kansas Veterinary Medical Association will be held in Topeka, Kansas, January 7th and 8th, 1913. A good program is assured and a large attendance is desired.

J. H. BURT,
Manhattan, Kan. *Sec'y.*

REPORT OF MINNESOTA LIVESTOCK SANITARY BOARD FOR 1912

This report in a nicely arranged cloth bound volume is conclusive evidence that Minnesota has a live and aggressive Livestock Sanitary Board.

The report deals with the various infectious diseases of animals occurring in the state during the year with a considerable amount of statistical information from which we glean that the amount paid for glandered animals during the year was nearly $7000 and the amount paid for

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tuberculous animals condemned by the state was more than $22,000.

The report contains among other good articles a strong plea for adequate legislation for controlling rabies which has been very prevalent in the state during the past year.

THE NEW TREATMENT FOR AZOTURIA

The profession has been introduced, recently, to a new treatment for this dreadful disease, azoturia. It is called Azolysin. This remedy is guaranteed by the firm to cure azoturia; in case it fails they agree to refund the purchase price. The firm that manufactures this compound had a tremendous run on this remedy, the fact is that for a time they could not supply the demand. Now, no doubt that the profession will be supplied, or may be supplied at this moment. I would like to call on every veterinarian that has used Azolysin to try to report his first experience with the remedy. If everyone will do this, we shall be able to learn of the virtue of Azolysin more quickly.

Remember that the remedy must not be used on cases that are standing up, for those cases will get better without any medicine, but take those cases that are down and then report.

THE AMERICAN JOURNAL OF VETERINARY MEDICINE is a journal that I greatly appreciate. We should use it just as the family use a cosy corner of the home, to discuss the future welfare of the family. The journal is ours, let us make good use of it for the advancement of our profession. Practically speaking, we cannot get a better medium through which to tell of our success and explain our blunders.

R. LA POINTE, V. S.

St. Peter, Minn.

THE TURKEY BUZZARD AS A CARRIER AND TRANSMITTER OF ANIMAL DISEASES*

By Geo. R. White, M. D. V. S., State Live Stock Inspector for Tennessee.

Since the turkey buzzard is such a menace to the live stock industry of Tennessee—on account of being a disease carrier—it is well that our live stock raisers have their attention directed to this bird, particularly its habits and dangers.

The buzzard is one of our largest and most common birds. It is filthy and repulsive on account of being a scavenger. It is much more common in the southern states than those to the north of us; however, it is occasionally observed as far north as Canada. It exists in greater or less numbers in every state in the Union. The buzzard is sluggish

*No. 71 of Talks to Farmers.

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and lazy in its habits and has a decided preference for warm latitudes.

It is in southern Alabama, Georgia, Florida and the West Indies, that the buzzard finds life pleasantest. However, it breeds and thrives well in Tennessee. Here we find them present at all seasons of the year in great numbers.

It is molested by no other bird, since it attacks none. It makes no enemies, since it feeds almost entirely on carrion, which no other bird begrudges. The youngest chickens in the yard show no alarm when a buzzard alights in their midst. They know from instinct that no more harmless bird to them exists.

The buzzard depends for protection entirely upon disgorgement of the foul carrion contents of its stomach upon the intruder. When disturbed in the act of devouring a fetid carcass—especially when extremely hungry—they express great displeasure and blow through the nose, making a low, hissing sound or grunt, and lift their wings in a threatening attitude. This hissing and grunting sound is the only noise a buzzard ever utters.

Since the buzzard feeds upon the carcasses of animals indiscriminately and are themselves endowed with natural immunity against most infectious diseases, they are now considered carriers of all animal diseases which are of germ origin.

They carry the infection of blackleg, anthrax, tuberculosis, hog cholera, glanders and many other diseases from place to place. This infection is carried upon the whole surface of their body, especially on the mouth and feet, as well as in their stomachs. All of the natural discharges from a buzzard's body are disease-laden at all times, hence it behooves every owner of live stock to see that these disease-carrying creatures are not allowed to light upon their premises.

Aside from public stock yards, I consider the turkey buzzard directly responsible for most of the outbreaks of hog cholera in Tennessee.

Many of the southern states afford the buzzard egal protection. This accounts in part for their great numbers. At one time the buzzard was protected by law in Tennessee. At that time any one killing a buzzard was liable to arrest and fine. Of course when that law was passed no one had any idea that the buzzard was such a spreader of disease.

Some people are under the erroneous impression that the buzzard at this time has legal protection in Tennessee. For their benefit I will say that the law protecting the buzzard was repealed in 1903. Since that date the buzzard has had no legal protection in this state. Any person may kill a buzzard without violating any state law. Since that

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Therefore we do not bleed from the tail at different intervals after hyperimmunizing, but kill our Hog on that day, thereby procuring a serum containing the highest amount of anti-bodies that is possible to obtain.

Our serum is POSITIVE as an immunizing agent and stands high as a curative, which has been proven in very sick herds.

A trial is convincing. *Once* used, *always* used. For the farmer will demand it. For further information and prices write the

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Dr. G. I. Blanchard, Pres. Dr. E. B. Hollecker, Sec. and Treas.

is a fact, every good citizen should do his part towards exterminating the buzzard, as it is a menace to the livestock raising industry in Tennessee, on account of being a spreader of hog cholera and many other infectious diseases.

If all persons would make it a rule to bury all animals which die on the farm, then there would be no inducement offered the buzzard to visit their premises. Besides being an attraction to buzzards, the stench from fetid carcasses of large animals constitute a public nuisance, in any community where they are allowed to decompose on the surface of the ground. Some effort should be made to induce the incoming General Assembly to pass a law compelling owners to either burn or bury all carcasses of animals which die upon their premises. Such a law at this time is necessary from a human as well as an animal health viewpoint.

ENLARGED CARPUS REMEDIED

Mule, seven years old, fifteen hands high, had canker of carpus or knee. Several veterinarians had been treating him with antiseptic powders with no results whatsoever. Being a visitor, I was shown the mule, and in fact was told I could have him, as they were told no treatment would effect a cure. I asked him to chance a dollar or two for medicine and I would give him a trial, so he did, with the following results.:

First morning. Antiphlogistine applied warm to knee and hyposulphite sodium internally. Told to continue for a week and let me know how he was getting along. In about eight days I saw the owner and he shook hands with me and said, "Doc, that white salve is the best stuff I ever saw, and do you know that mule's knee has gone down and the sore is no bigger than a dime."

In ten days he made a complete recovery.

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A final swab over with watery lotion is advisable, for any excess of spirit solution left between the folds of the skin causes a superficial burn.

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I have been asked if I use Antiphlogistine. Well! I guess I do. If it hadn't been for Antiphlogistine, Lou Dillon with record of 1.58 would never have been sired.

I was on the big stock farm, Valensin's, in California. A fine brood mare, Venus, had had laminitis and the hoof was loose and had run on to "seedy toe," making a track seventeen inches long.

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When Mr. Valensin returned he said, "Doc, did the mare suffer any when you killed her?" I asked him out into the pasture and he couldn't believe his eyes.

Her next foal was Sidney Dillon, sire of Lou Dillon, 1.58, the greatest of all trotters.

DR. CHANDLER QUINTIN.

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ACUTE LARYNGITIS RELIEVED BY ANTIPHLOGISTINE

September 24, 1908, I was called to see a mare that the owner thought had the glanders. I diagnosed it as an acute case of laryngitis; temperature, 104° F.; pulse, wiry; respiration, normal. I proceeded to treat the case as follows: Antiphlogistine poultice to larynx in conjunction with internal treatment.

Morning, 25th. Temperature 100° F., pulse, normal; respiration, normal; cough slightly diminished, but not altogether. Antiphlogistine treatment continued.

Morning, 26th. Temperature, normal; pulse, normal; respiration, normal; cough, very little.

Morning, 27th. Discharge from nose ceased, also the cough. Animal placed on full diet with tonic. Owner informed not to work mare for ten days.

L. A. BOWEN, D. V. S.

Biloxi, Miss.

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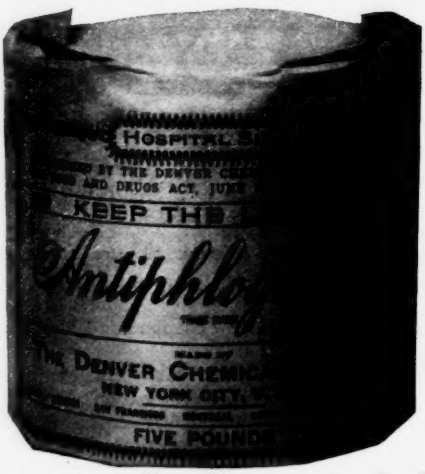

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